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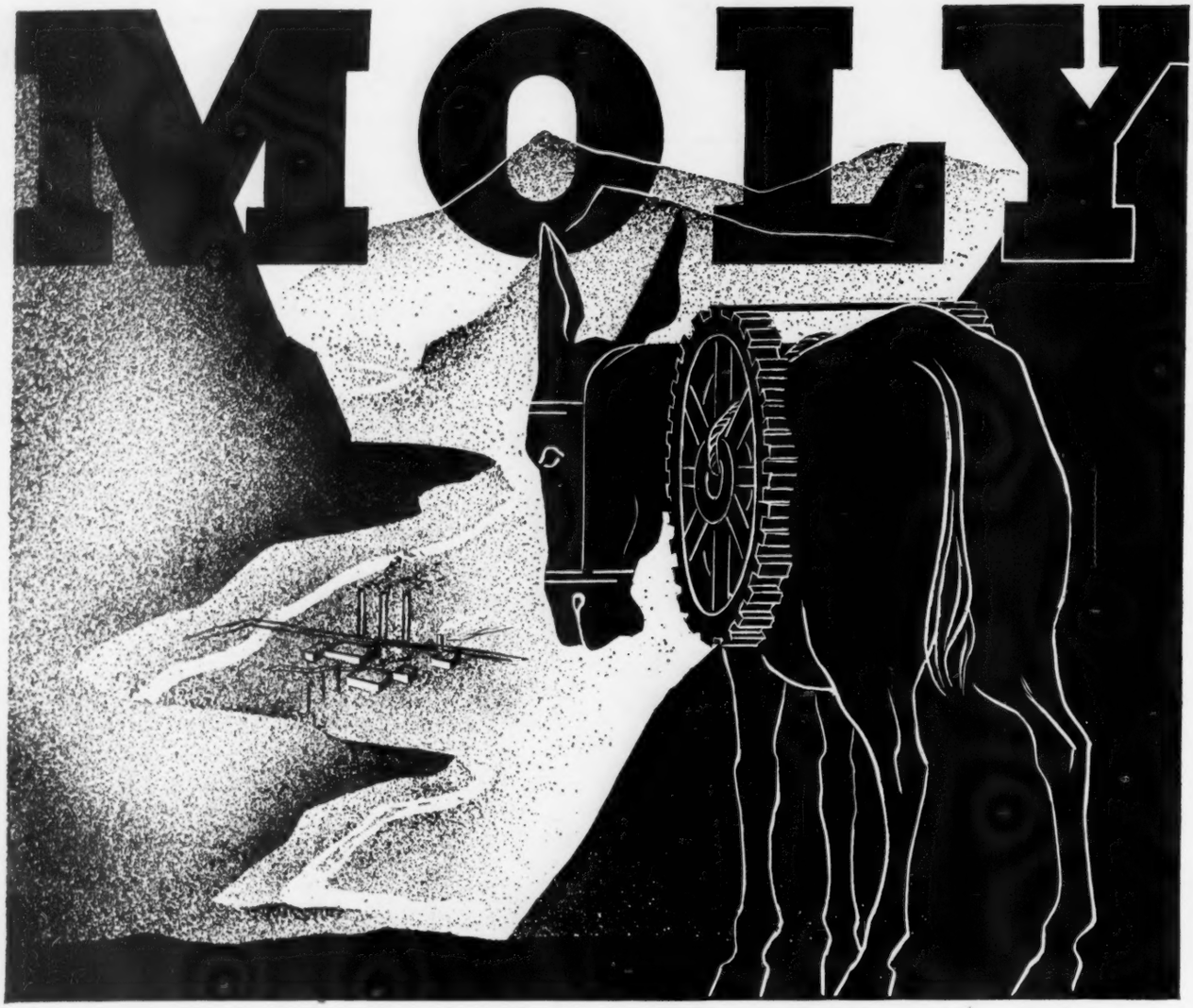

where replacements are costly

A STAMP MILL in a trackless Andean interior. . . . Picture the time and money losses involved in parts replacements under such circumstances! And yet there are literally thousands of nearby instances — in industrial, engineering, oil, mining and other projects — where replacement problems are no less serious . . . where inaccessibility, removal and installation difficulties, labor, transportation, shutdowns and what-not exact heavy tolls . . . where mechanisms ought to be qualified to let their users "put them to work and forget them."

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As the Editor Views the News

ON FRIDAY when President Roosevelt declared that the Supreme Court decisions had thrust the country back to the "horse and buggy state of interstate commerce" (p. 13), he was too pessimistic. The momentous rulings carried the nation back only to the sanity which prevailed before Mr. Roosevelt became innoculated with the virus of the brain trusters' new deal. On March 2, 1930, over Station WJZ, Franklin D. Roosevelt, then governor of New York, in lauding the constitution of the United States as the "most marvelously elastic compilation of rules of government ever written," used precisely the same arguments which were employed by the Supreme Court in its decisions of May 27.

• • •

Constitution O.K. in 1930

In that address Governor Roosevelt held "home rule" essential, praised "individualism," assailed the building of federal "commissions and regulatory bodies . . . like huge inverted pyramids," condemned "mischievous meddling" by the federal government, etc. In short, he praised everything the Supreme Court upheld last Monday and condemned everything that he, as President, has done in violation of the constitution since he took office in 1933. Again in 1932 Mr. Roosevelt ran on a platform which advocated the principles upheld by the Supreme Court's decisions and which denounced most of those President Roosevelt has followed since election. The decisions simply carry us back to pre-new-deal sanity.

• • •

No Need To Get Excited

Striving like disturbed ants to rebuild a bureaucracy (p. 10) will not meet the immediate problem of the day. The decisions mean that recovery shall take precedence over reform. For industry, this involves new responsibilities (p. 23) in self-government. Industry already has shown a disposition to go slow in shifting from the established practices. This is a time for deliberate action, not for hot-headed plunging into new unknowns. Washington, after it regains its equilibrium, may well study the following as a useful guide in policy:

> "The government can best contribute through stimulation of and co-operation with voluntary forces in our national life; for we thus preserve the foundations upon which we have progressed so far—the initiative of our people. With vision and devotion these voluntary forces can accomplish more for America than any spread of the hand of government."

These words were spoken by a distinguished secretary of commerce to members of the United States chamber of commerce meeting in Cleveland, May 7, 1924.

• • •

To Buy or Not To Buy?

If the recent marked improvement in the demand for machine tools continues through the next few months without undue abatement, it will lend auspicious support to the machine tool exposition scheduled for Sept. 11 to 21 in Cleveland. Much of the current buying is traceable to the recognition by manufacturers of the unusual values offered in the latest models of machinery and shop equipment. To help executives in the metalworking industries to visualize these money-making possibilities in improved equipment and also to stimulate interest in the approaching machine tool congress and show, STEEL in this issue (p. 26) inaugurates a series of articles by leading machine tool builders on "Can Potential Users Afford Not to Have the Latest Models?"

• • •

New Clinic on Open Hearths

Appropriately, the new series of articles by William C. Buell Jr. on the design of open-hearth furnaces starts at a time when renewed interest is being displayed in the rehabilitation of steelmaking capacity. The current series (p. 56), which deals with the ancillary system of the open hearth—that part below the charging floor, is supplementary to the articles on the portion of the furnace above the floor, which were published about two years ago. Every executive identified with steelmaking should read this series because it represents a clinical study of the best design and practice in the leading steelworks of the industry.

E. L. Shaner

Steel Tries To Hold Principles of Code as Roosevelt Hints at Revised NRA

REGARDLESS of whatever form the revised new deal takes following the annihilation of NRA and the termination of compulsory codes by the United States Supreme Court May 27, the iron and steel industry is determined to preserve certain basic principles of the steel code under which it has been operating since Aug. 19, 1933.

These principles include fair trade practices, reasonable standards for hours and wages, and stabilization of prices with a view to preventing ruinous, uneconomic price-cutting. To these fundamentals of the original concept of NRA, as distinguished from the blighting regimentation grafted on it by the new deal philosophy, the industry continues to subscribe.

To this end, leading executives of the industry issued statements immediately following the Supreme Court's decision last Monday, urging continued adherence to the standards of the code, in an effort to prevent the chaos of Washington spreading to industry.

Wait for Smoke To Clear

Having succeeded in this stop-gap measure, directors of the American Iron and Steel institute, heretofore the steel code authority, are meeting in New York early this week to take further action. By this time it is expected that the administration will have recovered from the shock and have re-formed its lines.

Not in modern history has the underlying philosophy of a national administration experienced such a repudiation. In the Schechter poultry case, chosen by NRA itself as a test case, the Supreme Court unanimously stood against federal regulation of hours, wages and other phases of intrastate business.

In the accompanying Frazier-Lemke case the high court ruled against seizure of private property without due process of law. The ouster of William E. Humphrey, late member of the federal trade commission, on the grounds of incompatability with the administration was held to be illegal.

The net effect of these three decisions is to restore constitutional government. Under the commerce clause of the constitution, regulation of and interference with intrastate commerce—which steel is—is prohibited. All codes are illegal because they represent a delegation of congress' law making power to the President.

The legal framework within which TVA and the securities act were built, and on which the administration is trying to rear the new banking and Wagner labor disputes bills is held to be invalid. The very ground has been cut out from under the new deal.

Immediately following the Supreme Court decision, it appeared that the administration would entertain three alternatives— an invitation to industry to join in voluntary codes, reconstruction of NRA within the narrow confines left by the decision, and the rehabilitation of the federal trade commission to promote fair trade practice conferences such as Herbert Hoover set in motion when a member of the Harding and Coolidge cabinets.

On Friday the President began issuing a series of statements calculated, as he stated, to explain and define the situation prior to discussing remedies for its correction. The tone of the first statement indicated a bitterness that the Supreme Court and the constitution cannot be stretched to fit modern conditions, and hinted at some means of continuing the principles of NRA. The sentiment was that, regardless of what the Supreme Court declares, the new deal is the right remedy and the means for effecting it must be found.

This viewpoint was accepted in Washington as tantamount to a determination on the part of new deal bureaucracy to continue in power and rebuild NRA.

With the promulgation of the Supreme Court decision in the Schechter case, a wide open iron and steel market obtains for the first time in almost two years. All restrictions on hours, wages, basing points and construction of new raw iron and steel making capacity are lifted.

Throughout last week, awaiting some indication of new federal policy, producers of iron and steel stood pat. So far as known, no concession in price was granted. However, in some cases buyers expressed an expectancy of some adjustments and there was an increasing tendency among consumers to wait out the market.

Responsibility Is Realized

Following the first burst of elation that the corroding theory of the new deal as imposed upon industry through certain features of NRA and probably also through the Wagner labor disputes bill has been blasted, came a sobering reaction concerning the responsibility of industry.

Fears voiced in Washington through less conservative and responsible leaders that labor chaos would follow were not realized. Throughout industry, leaders announced their continued adherence to present wage and hour standards, in the main. For a continuance of the beneficial standards of fair trade practices there also was widespread demand.

While no clear vision into the fu-

With NRA Declared Unconstitutional—

Steel code effective Aug. 19, 1933, and renewed and amended on Nov. 17, 1933, and May 31, 1934, is dead. Compulsory enforcement was terminated by the federal government May 27.

Price filing ceases. An entirely free market in regard to prices again exists. All restraints on contracting also are lifted.

Wage and hour restrictions cease.

No court decision has been made concerning section 7a of the recovery act, specifying collective bargaining, but the machinery for its enforcement no longer exists.

Embargo against the construction of new iron and steelmaking capacity is raised.

Basing points specified in the steel code become optional.

Unfair practices cited in the steel code are no longer operative.

American Iron and Steel institute ceases to function as the code authority.

Federal trade commission is placed in position to open fire on basing point system and to start on its objective of making every producing point a basing point.

Any effort to maintain prices generally is a liability to action by the department of justice under the antitrust laws.

These are the technical, legal consequences of the decision by the United States Supreme Court May 27 declaring NRA unconstitutional. Pending clarification of the situation, the steel industry is temporarily proposing to continue operating under its code, but strictly speaking such co-operation becomes entirely voluntary.

ture was possible last week, with Washington still upset, a ray of optimism for the long pull penetrated industry. Generally, the expectation was that the readjustment following the return to constitutional government would occur during the normally dull summer months, thus laying the groundwork for a substantial fall upturn. Steel leaders began talking of a second half year better than the first half in point of production.

At Detroit the reaction to the termination of compulsory codes was entirely favorable. The incidence of any unsettlement in prices appeared likely to be minimized inasmuch as most manufacturers are approaching the end of their factory runs on current models, and some have made what would normally be their last buys of materials.

This tapering off in production is consistent with the program of the industry, adopted under its code to level off peaks of production, whereby the annual automobile show has been advanced from January to the week beginning Nov. 2. This necessitates a start on production of 1936 models in late September or early October; in fact, an agreement among manufacturers is calculated to have design work on new models completed by Sept. 1.

Plans May Be Changed

However, in event general business displays symptoms of a good fall recovery it may be more profitable for the industry to continue pushing present lines, in which the probable summer curtailment for steel and other automotive materials would be mitigated and the customary preshow letdown be postponed until November and December.

The only reservation in these optimistic outlooks by both the steel and the automotive industries was the possibility that the administration, by talking chaos and crisis, might freeze recovery, and thus artificially prove a seeming necessity for something like the distorted concept of NRA.

In regard to hours and wages, the treatment of its labor by the steel industry has been far more generous than that specified by the minimum in the steel code. Whereas a maximum work-week of 40 hours is prescribed, the average per week per wage earner in April was 34.2 and in March 33.9. In April, 1934, it was 33.7. Average earnings per hour were 65.9 cents, contrasted with a range of 25 to 40 cents in the code.

One reaction to the Supreme Court decision knocking out all codes may be a slight lengthening of the work-week to permit more economical cost of production and to fatten weekly pay envelopes—a consummation long sought by labor itself. These improved earnings, it is believed, will not diminish the total volume of employment but rather may set in motion a cycle of spending that would be a distinct factor for recovery.

Plans for expanding facilities for making pig iron and steel ingots may now be revived. Under the code there was a limitation on the installation of this capacity, but no prohibition on finishing mills, in which direction facilities have been greatly augmented in the past two years. It is not known that any new blast furnaces are under consideration, but some increase in open-hearth furnaces is expected, notably at the Great Lakes division of the National Steel Corp. in Ecorse (Detroit).

Hope for Co-operation

Steel leaders were hopeful last week that the spirit of co-operation engendered by the close relationships of the past two years would survive the temptation for any lone wolf proclivities.

Co-operation in regard to maintaining hours and wages appears comparatively simple. Maintenance of fair trade practices appears a little more difficult but not insuperable. The real problem confronting producers is to maintain prices on a remunerative basis, yet keep clear of monopolistic and antitrust law entanglements.

The original concept of NRA was that in return for shortening the work-week, thereby increasing employment, and raising wages, thereby increasing buying power, industry would be permitted to keep prices on a level requiting it for these gestures. In other words, immunity from the antitrust laws was traded for a constructive stand in regard to labor.

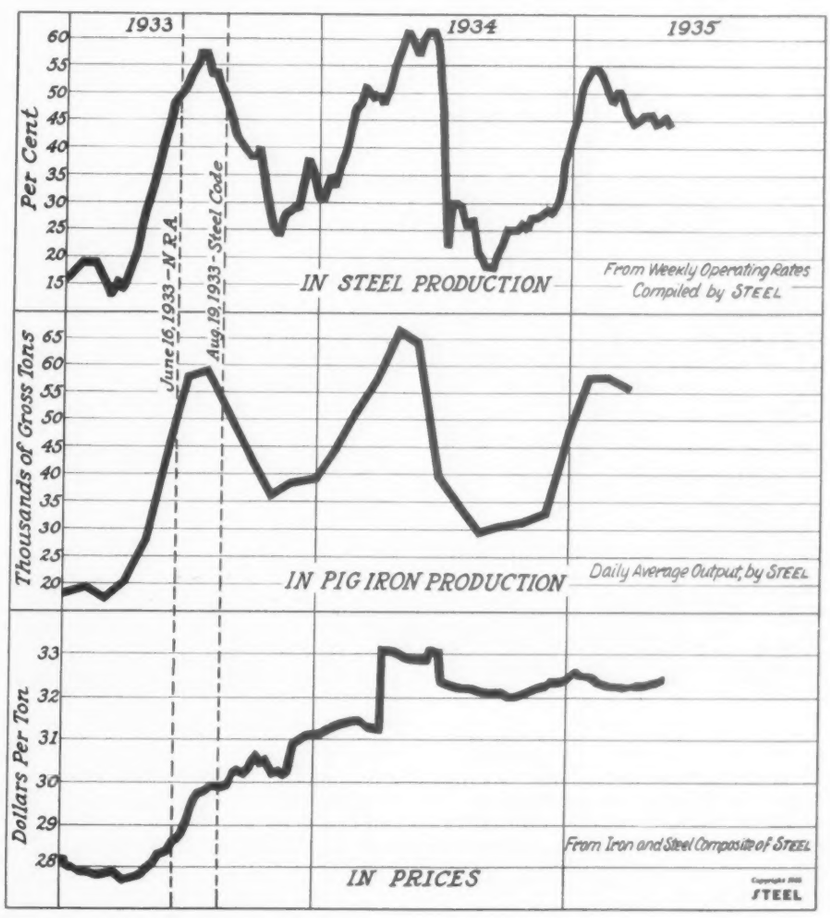
This veil of immunity is now lifted. For the industry to continue filing prices on an open-price basis with the Institute does not appear to be possible. Voluntary co-operation appears to be the only means. Certainly the first impulse of important leaders is on the constructive side. Said W. A. Irvin, president of the United States Steel Corp.:

"The policy of the United States Steel Corp. for years has been in the interest of stable conditions in every phase of the steel industry. The Corporation will continue to pursue such a policy.

"The subsidiaries of the Corporation will continue their relations with employes under the employes representation plan, which has proven mutually satisfactory to both men and management."

And Tom M. Girdler, chairman-

What NRA Did To Iron and Steel—



president of Republic Steel Corp.:

"I can speak only for my company, but it is my hope and my belief that the steel industry, as a whole, will stand solidly together for a continuance of the wage standards and the methods of fair competition developed under the steel code.

"During the past two years, a new spirit of co-operation and fair play has grown up in the steel industry to the benefit of employes, customers and the industry itself, and I believe steel men everywhere will support any effort on the part of the government to develop a constructive program which will preserve these benefits.

"Meanwhile, in our company and to the best of my knowledge, throughout the industry, business is being carried on just as it was before the Supreme Court's decision was handed down. This will be continued until a new plan of procedure for the industry is devised."

And Charles R. Hook, president, American Rolling Mill Co.:

"The unanimous decision of the Supreme Court in declaring the national recovery act invalid raises some very serious and practical questions with respect to business stability that require the most careful and constructive action on the part of business management.

"Whether we approve or disapprove the economic philosophy which was the basis for the act, we must recognize that as a result of the codes large wage advances were made and in our major industries at least some degree of stability has been secured in the price structure.

"Every business executive owes it to his stockholders and the employes of his company to exert every effort to secure the co-operation of all elements of business in an endeavor to work out a constructive program and prevent the cutting of wages and the demoralization of markets. Rules of fair trade practices which have been agreed to by business groups under the operation of codes have been helpful in establishing a generally higher standard of business ethics. It would be too bad if the good thus accomplished were to be lost through hasty action or selfish impulse."

And Frank Purnell, president, Youngstown Sheet & Tube Co., Youngstown, O.:

"The decision of the Supreme Court, it is hoped, will not affect the principles and fair-mindedness of business men and labor. It is hoped that a way will be found so that the co-operative experience of the last two years will be continued for the benefit of labor, business and the public.

"We believe in the maintenance of the present wage scale and hope nothing will be done to disturb it."

Similar centiments were expressed by Harry E. Sheldon, president, Allegheny Steel Co., Brackenridge, Pa.; Henry R. Roemer, president, Sharon Steel Hoop Co., Sharon, Pa.; Julius Kahn, president, Truscon Steel Co., and other typical leaders.

Industry was being warned last week not to let up in its fight against the Wagner bill. Although patently unconstitutional, the danger confronting industry was its enactment and a source of discontent pending an appeal to the Supreme Court.

Highlights of NRA

National industrial recovery act, basis for NRA, was signed by President Roosevelt June 16, 1933, *effective for two years.*

Steel code was signed Aug. 19, 1933, *for a trial period of* 90 *days, was amended Nov.* 17, 1933, *and on May* 31, 1934, *for the life of NRA.*

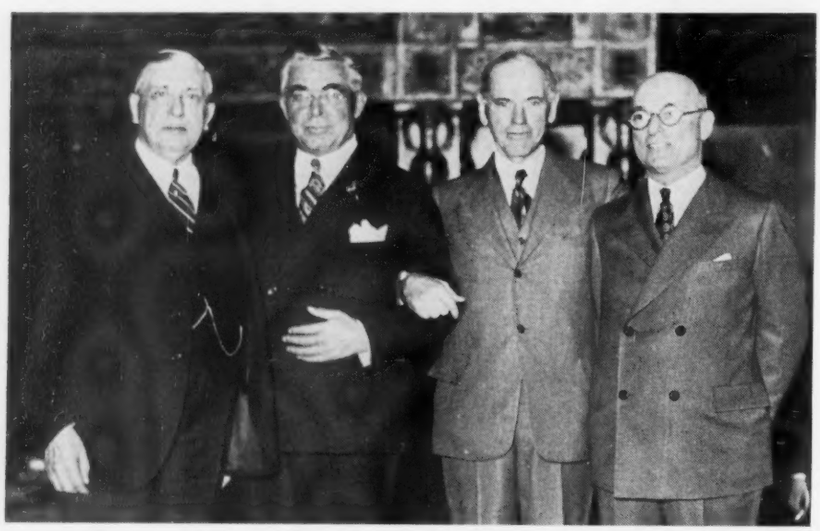
American Iron and Steel institute was set up as the steel code authority.

Number of codes, 546 *regular and* 185 *supplemental.*

NRA employes in Washington numbered 3323, *and in the field* 1239, *exclusive of employes of code authorities.*

Estimated that originally, before service industry employes were exempted, 18,220,000 *persons were governed by codes.*

Cost of NRA annually to the government, paid through PWA allotments, was about $14,000,000. *Estimated cost to industry through code authority contributions was about* $41,000,000.



At the American Iron and Steel institute meeting in New York, May 23, *these four leaders of industry literally joined hands. Left to right, they are Charles M. Schwab, chairman, Bethlehem Steel Corp.; W. A. Irvin, president, United States Steel Corp.; Eugene G. Grace, president, Bethlehem Steel Corp., and Tom M. Girdler, chairman-president, Republic Steel Corp. Since then the Supreme Court has spoken and overthrown NRA, and now they have joined hands again in urging the industry to stand pat on the steel code for the time being and to continue co-operating in hours, wages and trade practices. Acme photo*

Meetings

GRAY iron foundry industry meeting scheduled for Cincinnati June 6-7 will definitely be held in spite of the Supreme Court decision on NRA, according to H. M. Halsted Jr., executive vice president of the gray iron foundry industry code authority and the Gray Iron Founders Society Inc., Cleveland. The program will be modified, but the industry will discuss opportunities of greater importance now opening up.

AFA PROGRAM ANNOUNCED

Program has been announced for the 1935 convention of the American Foundrymen's association, to be held in Toronto, Ont., Aug. 20-23, with headquarters at the Royal York hotel. Technical sessions, shop operation courses, roundtable luncheons, plant visitations and apprentice training sessions are features of the program.

The steel division committee of the A.F.A., under chairmanship of John Howe Hall, Taylor Wharton Iron & Steel Co., High Bridge, N. J., has arranged two steel sessions and a roundtable luncheon discussion. The latter will be under direction of A. W. Gregg, Farrel-Cheek Steel Foundry Co., Sandusky, O. Papers and reports for the other two meetings will cover utilization of X-rays at the Naval Gun Factory in the correction of foundry practice, impact tests, specifications, contraction and solidification of steel for castings, and temperature gradients.

N. I. A. A. TO PITTSBURGH

Convention of the National Industrial Advertising association has been scheduled for Pittsburgh, Sept. 18-20, at the William Penn hotel. D. Clinton Grove, of the Blaw-Knox Co., is president of the Pittsburgh chapter of the NIAA.

WINDOWS OF WASHINGTON

WASHINGTON

ONLY a person who has circulated around Washington in the past week can gain a concept of the lengths to which the new deal will go in fastening its philosophy of regimentation and planned economy upon the country.

The Supreme Court last Monday precipitated a crisis for the new deal; now, the new deal apparently is doing its best to manufacture a crisis for the country.

The keynote of this possible new crisis was uttered from the White House by the President himself over the week-end. Whereas most new dealers have been merely confused the past week, the President himself apparently has become bitter.

The attitude of the President, as voiced Friday in the first of a series of week-end statements, is that the objective of the new deal is correct regardless of what the Supreme Court has ruled, and that the constitution should be stretched to accommodate the new deal philosophy.

Elation was the first sentiment expressed by industry following the court's decision. The brisk reaction was that first principles were being restored, that during the normally-dull summer months a shakeout that would have had to come sometime would occur, and that the stage was being cleared of obstacles to genuine recovery.

Administration Vulnerable

While it had been frequently voiced in Washington, even by new dealers themselves, that the recovery act might be found unconstitutional, there is no gainsaying that the decision caught the administration napping. Not within the memory of living man has so hectic a condition been apparent in any national government.

General Johnson's first public utterances warned of chaos. Generally, there was a suggestion that labor might lose all it had fought for in 7a—a suggestion calculated to make organized labor even grimmer than it has been. The admonitions to industry generally not to cut wages and lengthen hours virtually built up a feeling that industry was preparing to go back to the dark ages.

On Friday, at a 2-hour press conference that broke all records for length, the President added fuel to the flames when he said, for direct quotation—another unusual development—that the Supreme Court has put the country back in the "horse and buggy" state, that the securities act was jeopardized, that a barrier had been raised between intrastate and interstate commerce which relegated back to the states all control over social and economic conditions, and that the federal government was being denied in a crisis a measure of control now wielded by all other governments in the world.

Calamity Howlers

It is not a colored viewpoint to say that the apparent intent of the various utterances of new dealers is to create a feeling of insecurity, to precipitate unsettlement and uncertainty, which could be pointed to as the direct consequence of the court's decision. This very uncertainty, fanned by the administration, could be kept alive until the presidential election in 1936. The impression is gaining ground that the new deal wants to fight the election on the ground of its philosophy, and continued unsettlement into 1936 would prove a convincing point.

The other side of the picture is that the structure of industry has been purged of an evil, consuming fever, that regardless of the artificial turmoil created at Washington the court's decision represents a healthy return to first principles, and that after the full import of the defeat of the new deal dawns upon the country recovery cannot be halted.

Following the reading of the court's decision last Monday Washington began to be overrun with conferences. At the White House, at NRA, in every department, in hotel lobbies the conversation was monopolized by the Supreme Court.

Industrialists from all parts of the country again converged on Washington, in a manner reminiscent of code hearing days. Peculiarly enough, the administration was prepared for the decision in the gold cases, but no one expected so complete an overturning as in the Schechter, Frazier-Lemke and Humphrey cases.

Immediately following the decision the President began calling in authorities — prominent lawyers, businessmen, legislators, even newspaper editors. Many arrived via the back door of the new White House office building — an unusual procedure. General Johnson called twice at the White House in one day while he was reported to be in New York.

Not many tools remained for NRA officials to lay down, but whatever picks were in the air at NRA headquarters were promptly dropped early last Monday afternoon. Late last week it was reported that NRA officials would be paid up to and including June 16—the legal expiration date — and after that it would be every man for himself.

Entire System Bogs Down

During the past week some administrators insisted on making formal acknowledgement of communications received, but they were not permitted to make long distance calls or send telegrams. In fact, even the letters were a waste of time because all were held up in the NRA mailing room.

When in the middle of a hearing Chairman Biddle of the national labor relations board was informed of the Supreme Court's decision he interrupted a witness to explain the situation and adjourn. But as a matter of courtesy to the witness, he

was permitted to complete his testimony.

As has happened in the past, the government itself is proving to be a chiseler. On May 20 the joint congressional committee on printing received bids for a six-months' supply of paper for the government printing office. It was to have made the award promptly, but there is now every indication that all bids will be thrown out and new ones asked—for the reason that with codes gone lower prices may be submitted!

Code Authorities in Uproar

There has been a great difference of opinion here as regards the effect of the court's decision among the officials of the many code authorities located in Washington. For instance, there were some code headquarters which actually began to close up on Monday evening following the decision.

Some even went so far as to begin taking inventories, and the secretary of one code authority, who had some $15,000 left in his bank account obtained a new bank book, and began checking out money on a pro rata basis to those who had paid in their assessments. In one or two cases, code authority headquarters celebrated hilariously.

Of course, there are many others who are simply "standing by" in the hope that the administration will find some way out — but most of the code headquarters have agreed that they will close after June 16.

STUDY NAVAL TOOL NEEDS IN HOPE OF WORK-RELIEF FUNDS

A committee of naval officers will leave Washington on June 4 to make a survey of all of the navy yards in the country with the idea of bringing the shops of these yards up to date from the standpoint of machine tools and other equipment.

R. E. W. Harrison, chief of the machinery division of the department of commerce will accompany the committee. It is being done at the direction of the secretary of the navy. The survey will be completed about the middle of July.

When the work has been finished, it is understood that the navy department will prepare a report in the hope that some of the money from the work-relief appropriation will be forthcoming to help purchase the needed machinery. It is not believed that Frank C. Walker, chief of the application division, has yet been converted to the idea that any of the money can be used for the purchase of machinery for the navy, but no final decision has yet been made on the question.

THERE'S ALWAYS MANGANESE!

Not even an epoch-making decision by the Supreme court can check the enthusiasm of domestic manganese producers. They succeeded last week in assembling more than 200 members of both the house and the senate and passed a resolution addressed to the President.

The resolution cited the Brazilian tariff question, urged the President to withhold further action on the Brazilian trade agreement whereby a reduction is granted on manganese and manganiferous ore, and in the meantime urged a special congressional committee to investigate the domestic situation.

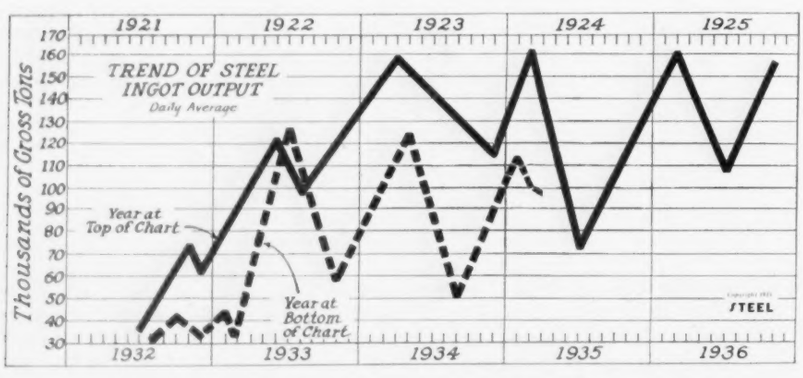
Refusal of steel companies to buy or pay the same prices for domestic manganese ore as for foreign ore since the application of the manganese ore duty of 1932 was attacked.

DUTIES FROM SWEDEN CUT

The state department has announced that under the proposed trade agreement between the United States and Sweden that the American duty on sponge iron was reduced from $2.25 to $1.25 a ton and on muck bars valued above 2½ cents a pound from 8, 1, and 1.5 cents to 5, 8/10 of 1 cent and 1 cent per pound.

Reductions ranging from 19 to 40 per cent were made in the duties on unfinished steel, steel bars and slabs, round wire, flat wire and steel strips and alloy steels.

Is History Repeating Itself?



As this chart indicates, recovery from the depression when measured in terms of daily steel ingot production has been strikingly similar to the recovery from the depression of 1920. *Beginning in March,* 1924, *output went into a four-month slide, then snapped out of it with the longest sustained period of improvement of the period of recovery. Steelmaking operations declined in March, breaking the upturn that set in last October. If the pattern of the past is followed, there will be an easier producing situation up to midsummer, then a strong upswing. Considering the recent uncertainties, a moderate setback now might be a small price to pay for a genuinely brisk upturn carrying over until early* 1936, *at least*

Financial

REPUBLIC STEEL CORP., Youngstown, O., has again adjourned its annual stockholders meeting, this time to June 28, at 15 Exchange place, Jersey City, N. J. The meeting has been postponed, among other reasons, on account of the pending suit to prevent Republic acquiring the Corrigan, McKinney Steel Co. Federal Judge Raymond, at Cleveland, recent upheld Republic, but the matter of an appeal by the department of justice still is unsettled.

Iron Ore

JAPANESE delegations have been in Australia recently attempting to negotiate the further purchase of Australian iron ore or the right to develop new deposits.

One of the latter is on Coolon island, western Australia. The Japanese are reported offering to work these deposits with Australians, visualizing an annual output of at least 500,000 tons.

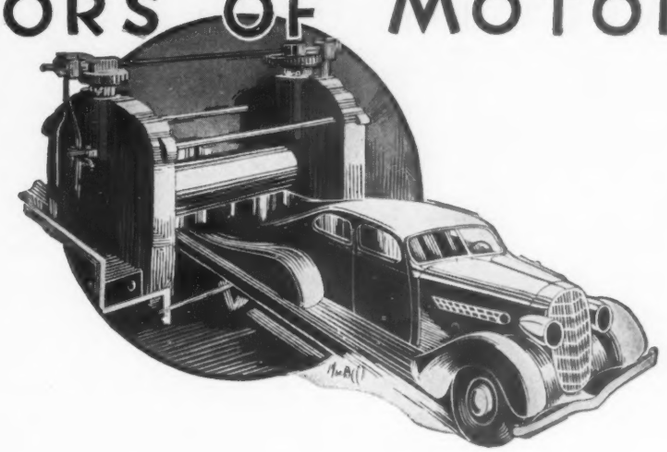
The Japanese also have inspected iron ore deposits at Iron Knob, in South Australia.

To these negotiations two obstacles have arisen: Protests by the Australian Natives' association, and the high rate of duty on imports of the machinery necessary to work these deposits.

A Correction

In STEEL for May 20, page 23, it was stated that "carbon steel holds its own in the railroad field in the new streamlined Baltimore & Ohio train—the Abraham Lincoln." The fact is, Cor-Ten steel, made by subsidiaries of the United States Steel Corp., was used.

MIRRORS OF MOTORDOM



DETROIT

ON PROVING grounds and secluded northern Michigan highways automobiles are roaring all day and frequently all night. They are plowing through mud — mostly man made — and sand. One driver makes short dashes, then slams on the brakes. Another tries to wear out his clutch. Still another is deliberately burning out bearings. Every part, in fact, is literally tested to destruction.

The old bodies of these automobiles belie their true identity, for beneath their hoods are 1936 engines being put to more gruelling tests than even the toughest or most inconsiderate driver ever will impose. Every few thousand miles these engines are torn down to measure wear and detect defects.

Meanwhile, back at automobile plants, designers are well along on 1936 bodies. Most of them have progressed from the initial blueprint stage and full-scale black board drawings to clay models. Some have even advanced to the point where full-size wooden bodies, exact in every exterior detail and interior appointment, have been built. Tool and die makers at this time have received little actual business, but they are beginning to figure.

Three Months to Deadline

This year there is a general agreement among automobile manufacturers that all new car designing will be completed by Sept. 1. This is expected to eliminate last-minute changes, which sometimes is pirating but more often the necessity for a manufacturer to exceed his original program to meet competition.

This Sept. 1 deadline on design is predicated upon the New York show opening Nov. 2. While the demise of NRA, and presumably also the end of the automobile code on a compulsory basis, may possibly reopen the date of the show, which was advanced from January in order to level off the peaks of production, this is not regarded as likely.

There is, however, considerable sentiment that the New York show should revert to a manufacturers' exhibit rather than a dealers' So far as the public is concerned, there is is no difference. But notwithstanding that manufacturers are relieved of some of the cost by the new arrangement, there still is considerable opinion that manufacturers should stage at least one national show a year.

A discussion of the effect of the NRA decision on the automotive industry will be found on page 11 in connection with a consideration of its reaction on the steel industry and its principal outlets.

Detroit Wants National Show

Incidentally, there is much stir in Detroit that a national show should be held here instead of New York, and that there should be a permanent exposition hall, similar to the furniture marts of Grand Rapids and Chicago.

With many producers planning to bring out their 1936 models in the late fall—Buick probably will be the first, sometime in August—discussion of changes is being soft-pedalled in order not to discourage the usually-brisk period of July and August. But behind the scenes things are humming, as indicated by engine and chassis tests and the almost daily conferences on body design.

Chevrolet's principal effort at this time is a revision of the standard model. Heretofore the current standard model has largely been the previous year's master model, but a complete redesign is understood to be scheduled for 1936. Production of this new standard job is scheduled to begin Oct. 1, with 30,000 to 35,000 units to be assembled in that month.

Having been delayed in its presentation and then having experienced a further holdup by the recent strike at the Toledo transmission plant, the master 1935 Chevrolet is just hitting its stride. Some parts have been released for it on the basis of a run of 140,000 jobs, indicating practically full production well into July. Priced more competitive with Ford, the revised standard Chevrolet, out this fall, may be General Motors' principal thrust at Ford.

Plymouth also is well along with the design of its 1936 car, now slated to be about 7 inches longer and to be radically streamlined. A current change in the hoods of the present Plymouth six line is the elimination of the Chic Sale influence. The five round holes are being eliminated, and horizontal chrome-plated bars now constitute the louvre. This type hood also is now standard on Plymouth commercial cars, and probably will be optional on the deluxe Plymouths.

It will be recalled that about four years ago Chrysler did considerable experimental work on a small low-price job, then expected to be a four and presumably for the Plymouth line. At that time Ford also was starting the design of his 44 series—smaller and lower-priced than the present V-8, but never put into production.

Revive Talk of Light Car

There appears again to be a little stirring in regard to lower-price cars, and Chrysler, to mention only one maker, is more active in this direction than it has been in several years. Some engineers feel that it should be possible to manufacture a car to deliver for $500, and to effect this a complete redesign is involved. The first approach is lightness, inasmuch as only about $50 of the cost of a car is direct labor and most of the remainder is material.

Rear engine mounting seems to figure prominently in many experi-

ments aimed at evolving lighter weight and lower-price automobiles. Weight appears to mean little in regard to roadability so long as the distribution of it is correct. Steel producers stand to lose a little tonnage per car but a decided increase in total volume by reason of the potential increased demand from a price field that has not been tapped since model T disappeared.

These experiments are not likely to mature for 1936 cars — in some cases they appear to be purely exploratory—but one interest is testing a small car with a five-cylinder radial engine mounted in the rear and concealed by a housing simulating a trunk. A six-cylinder rear mounted radial engine also has been designed. One maker is toying with a front drive, rear engine car.

Chrysler is one interest that is experimenting with radial engines, an important advantage of which is fewer pounds per horsepower. Ford is understood to have about a score of test cars with rear mounted engines — the regulation V-8 motor mounted parallel to the rear axle. Neither, however, is likely to appear in commercial production next year.

The more engineers delve into the problem of a light-weight, low-cost job the more they see that there was a spark of genius in the design of the small Willys. It is conceded that this job was ahead of its time, much as the Wills Ste. Clair pioneered in molybdenum steel, and that it was handicapped by its body.

Near Two-Million Mark

With April production officially set down as 477,716 units, making it the largest month since August, 1929, and May assemblies estimated at 425,000, the industry came within 30,000 units of crossing the 2,000,000-car line in the first five months. This is more cars than were made in all 1933.

Last week's production—65,675—reflected not only the Memorial Day holiday and some shutdowns for the remainder of the week, but also a generally easier trend. Excepting Nash, which is sampling dealers with its new low-price six, and Chevrolet which is making up both for a late start and the interference of its Toledo strike, manufacturers generally are easing up. No abrupt drop is in sight, but April probably will stand as the peak for the first half if not for the entire year. Unless the bottom falls out in June, the second quarter will prove higher than the first.

Materials and parts suppliers are feeling this trend, and their releases for June shipment are considerably lighter than for May. In fact, some automobile manufacturers are now making their last buys for the current series. By the time these materials and parts are delivered in June, and fabricated in July and assembled in August, the end of the 1935 series will be at hand. Many of these buys are irregular and are calculated to level off inventories.

Ford has curtailed rather sharply, this curtailment coinciding with the recent increase in the daily minimum wage from $5 to $6. About a month ago the Ford work-week was reduced from six to five days, and last week the third shift was eliminated. Ford is crowding cars on dealers in a manner reminiscent of old times.

An insight into the Ford labor situation is afforded by statistics showing that Ford and Lincoln at the time of the wage increase were employing 126,000 persons, of whom 81,000 were in Detroit and 41,000 were being paid the minimum.

Ford continues the envy of other manufacturers in handling labor. It appears that recently a number of malcontents were detected in various departments at the Rouge. Quietly they were all transferred to one department, then this department's work was farmed out, the department was closed, and the malcontents were automatically out of a job.

Probing Labor Sentiment

Incidentally, General Motors boasted up to the time of its recent Chevrolet strike in Toledo that it had no under-cover men in its plants. But this situation is being remedied and henceforth General Motors will have a close check on sentiment within its plants.

W. S. Knudsen, vice president of General Motors in charge of manufacturing and in close contact with labor, has cataloged labor three ways: 27 per cent are aggressive leaders, 40 per cent "carry on in the leaders' footsteps," the remaining 33 per cent "drag like anchors."

Speaking of labor, one of the most unusual situations in the industry has terminted at Cleveland with the settlement of the strike at the White Motor Co. During the strike there was no violence or any overt acts on either side. To occupy his idle men, Robert F. Black, president, donated baseball equipment and rented bowling alleys. During the strike he pleaded for harmony, and at the conclusion he spent several thousand dollars for full page newspaper advertisements declaring that "men in a common cause settle their differences like men."

Olds, which has been easing up a bit, by May 21 had built 80,623 sixes and eights, which exceeded the output of 79,813 for all 1934. It goes into the summer still operating double shift in all departments, the highest employment in its history, and with the prospect of passing in late June or early July its 1929 peak of 103,000.

Mills Turn Fabricators

A trend which is accentuated by the increasing number of continuous strip-sheet mills is that of blanking parts, some of them as intricate as instrument boards, at the mill. This gives the producing mill an additional income for the fabricating, it saves freight for the buyer, it cuts down scrap. Youngstown Sheet & Tube Co.'s subsidiary, the Youngstown Metal Products Co., is entering this field.

A Detroit company has perfected a door handle that is recessed into the door panel. To open, the handle is pulled out. This not only aids streamlining but also is a protection against thieves using a pipe or a wrench on the handle . . . Bulk freighters on the Great Lakes are chiseling into the business of transporting automobiles. Upbound freighters loaded with bituminous coal are stopping at Detroit for deckloads of new cars for upper lake ports . . . Edward G. Budd Mfg. Co., Philadelphia, is making stampings for steel cabs for the new Autocar srteamlined truck series . . . Chrysler may have the answer to styling; if you drive a last year's airflow model you can buy a 1935 hood and only your best friends will know it is not a 1936 model . . . This department recently observed that the height of foolishness was streamlining taxicabs that cruise at five miles an hour; a reader maintains that streamlining refrigerators is worse . . . Plymouth finds the following colors, in their order, to be the most popular this year: Black, gunmetal, blue, light beige, and maroon. Persons desiring special colors send Plymouth bright bits of evening dresses, colorful swatches of upholstery, race stable silks, etc.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,699
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,716
May	214,411	330,455	*425,000
5 Mo.	740,387	1,407,786	*1,961,066
June	249,727	306,477	.....
July	229,357	264,933	.....
Aug.	232,855	234,811	.....
Sept.	191,800	170,007	.....
Oct.	134,683	131,991	.....
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:	
June 1	65,675

Selling Steel on Quality Is Best Service to Industry

GREATEST service possible by steelmakers to their customers as well as to themselves can be supplied by more intensive metallurgical sales promotion work among engineers, best done by practical metallurgists rather than by men of the research type, is the conclusion reached by John M. Watson, chief metallurgist of Hupp Motor Car Corp., Detroit, and former president of the American Society for Steel Treating, in an address before the eastern sectional meeting of the American Society for Metals at New York, May 24.

Mr. Watson pointed out that the first standardization of automotive steels was undertaken in 1909 by the Association of Licensed Automobile Manufacturers and this was taken over in 1911 by the Society of Automotive Engineers. Its first report covered seven carbon and 11 alloy steels. The 1935 report covers 26 carbon steels, nine free-cutting steels, five manganese steels, 10 nickel steels, 22 nickel-chromium steels, 12 molybdenum steels and 25 others, a total of 109. He said:

"A list of steels such as are now in use is a burden to steel manufacturers and at present many automotive companies are trying to reduce the number of types and analyses of steels used. This is greatly to their advantage, as it tends to more economical purchasing, and makes the heat treating departments easier to handle.

Sales Engineering Is Need

"In this connection, I believe that the steel companies could be of greater service to their customers and also to themselves if they would do more intensive metallurgical sales promotion work among the engineers, and this work should be done by what might be termed practical metallurgists rather than men of the research type.

"Many of the steels now used may be considered as interchangeable as far as physical properties and adaptability are concerned. The chief engineers are so busy with the mechanical developments, new designs, patents and machine tool improvements that they do not have time to study and digest all the literature concerning steels. Metallurgical men of the type just referred to, could give them information about newly developed steels, their properties and uses in a condensed form. This should lead to closer co-operation between engineers and steel companies and work out to the mutual benefit of both.

"When we consider the use of metals in the automotive industry, it might be interesting to go back some years and see what has been done to make the car of 1935 the sturdy comfortable, long-lived piece of machinery that it is and to give credit where it is due.

"If you will analyze the 1935 models, you will find exactly the same units, performing the same functions as in the older car and that leads directly to the question as to what has made the difference in appearance and performance possible and the answer, of course, is metals. Who has made the difference possible? The credit must

John M. Watson

be given to the metallurgists for their increasing knowledge of metals, their properties, alloys and treatments; to the steel companies for their willingness to spend large sums for research work, improved methods of melting, rolling and fabrication, and to the engineers of the automotive companies for their continued improvement in design and their co-operative spirit."

Mr. Watson spoke at length of the changes from the cast iron cylinder blocks of an earlier day to the alloy iron in use today with higher physical properties necessitated by demands of higher compressions and greater speeds; improvement in materials used in crankshafts, camshafts, and other parts, also in heat treatment. He said further:

"The tendency to use better alloy steels has been strong in the parts of the car that have to do with the safety of the driver; by this, I mean the steering gear, the front axle, the steering knuckle, the steering arm and the pivot pin that holds the steering knuckle in place in the front axle. More attention is paid to design, material, heat treatment and inspection of these parts than any other unit of the car. Only the finest grades of steel can be used here and to get maximum results, only the most careful treatment can be used.

"So far only the chassis of the automobile has been considered but the largest tonnage of steel is used in the body and fenders. Compare the size sheet that was necessary to make body stampings of the old touring car with one now necessary to make the modern sedan body. These sheets must be uniform as regards hardness and finish over their entire surface and must take the most severe bends without failure.

"The division between strip and sheets used to be clearly defined but the widest strip steel of today has passed the sheet limit of a few years ago. Recently one of the trade papers announced the installation of a 42-inch strip mill, a few years ago 48 inches was the maximum width obtainable in sheets— now sheets 74 x 144 inches are used and one company would like to obtain sheets 83 x 155 inches for its bodies next year.

Die Performance Improved

"These developments have been made possible by the co-operation of sheet steel manufacturers and the improvement in stamping dies. When you consider that a complete set of fender and body-dies costs approximately $750,000 you can readily see that in order to pay for themselves, they must turn out a very large number of stampings; this has been accomplished by the use of high grade alloy irons. The pressures developed on some of the presses are very high and without the use of alloys, the complicated stampings would not be possible.

"Let's see what the automobile means to the steel companies. In 1922 the automotive industry used 8.98 per cent of the steel made. In 1934, it used 20.87 per cent and was the largest single user of steel. This amounted to 3,775,833 gross tons of finished steel; of this amount, 925,438 gross tons were in bar form; 1,057,713 tons were sheets; 1,050,650 tons were strip; 78,505 tons were tubing and 122,590 tons were wire products.

"Now consider the alloy steel; the automotive industry used the following percentages: 64.86 of hot rolled bars; 48.08 of cold drawn bars; 4.27 of sheets; 3.80 of plates; 49.44 of hot-rolled strip; 14.15 of cold-rolled strip; 45.81 of tool steels. This amounts to 53.31 per cent of the alloy steel made.

"These figures bear out what I have endeavored to show in my analysis of metals in automotive transportation—namely, that this has become not only a steel and alloy age but an alloy steel and alloy age and that it has been the mutual co-operation of engineer, metallurgist, and steelmaker that has made these remarkable developments possible."

Purchasers Discuss Effects Of Governmental Policies

STRONG protests against the continuance of laws and activities which tend to destroy the nation's economic system were voiced at the twentieth annual international convention of the National Association of Purchasing Agents, held at the Waldorf-Astoria hotel, New York, May 20-23.

Under the general theme, "The effect of national and international governmental policies on business trends and commodity prices," practically every speaker on the elaborate convention program warned against the dangers of artificial restraints imposed by ill-advised legislation.

Speaking on behalf of industry, Charles R. Hook, president, American Rolling Mill Co., Middletown, O., urged that those who "believe in the preservation of the economic system that has made this country what it is" fight against "those proposals insidiously prepared for the purpose of gradually tearing that system apart."

Prelude To Unrest

Mr. Hook asked his listeners particularly to protest the passage of the Wagner bill. He declared that if this bill should pass in its present form, the nation will witness unrest and disturbance such as American industry has never before experienced.

Referring to the author of the bill, Mr. Hook said: "If the senator is honest in his desire to promote peace and harmony, then he will amend his bill and provide for the protection of employes against intimidation, coercion and abuse from any source. If he does not it is prima facie evidence that his whole desire is to place the employes of American industry under the domination of national labor unions, which today have less than 10 per cent of our industrial employes as members."

Dr. Edwin Walter Kemmerer, Walker professor of international finance, Princeton university, speaking for banking, warned against the dangers of inflation. He ridiculed the idea of "controlling" inflation, stating that history shows numerous instances of the inability of governments to check inflationary movements once they reach the runaway stage.

Dr. Kemmerer declared that the government is spending money twice as fast as it is receiving it. These vast expenditures, he explained, are being financed by borrowing from the artificial credit which has been built up in the banks of the nation. He predicted that even on the present basis, prices and the cost of living will double within the next few years.

John Dickinson, assistant secretary of the department of commerce and spokesman for government in the symposium, advanced the thought that business executives, in failing to recognize "the measure of economic improvement which has been effected" in the past two years, are in danger of "playing into the hands of the agitators and demagogues from whose panaceas business has most to fear."

The effect of government policies was discussed by several speakers representing important commodities. C. S. J. French, editor, *American Metal Market*, discussing the effect of these policies upon nonferrous metals, outlined price trends in silver, copper, lead, zinc and tin.

The copper code, he stated, stands as an extreme example of creating a monopoly by practically barring the domestic use of all copper which does not qualify under the code as being "blue eagle" copper. "The official designation of the code is misleading," he declared. "It should be called a 'code for eliminating competition.'"

"With past experiences still fresh in mind it is to be hoped that the copper market will not be constructed solely upon the insecure foundation of a production and price control agreement. It is also to be hoped that 'blue eagle' copper will soon be thrown into the discard, and that all of the outside stock which was unfairly outlawed will have its rights restored."

E. L. Shaner, editor of STEEL, discussed effects of government policies in the ferrous metal industries.

It would be dogmatic to condemn sincere efforts to mitigate the acute maladjustments which existed in 1933, Mr. Shaner maintained in his address, yet, "today we should recognize the fact that many expedients we have tried since 1933, while having in some cases produced certain short-term benefits, in the long run will do more harm than good."

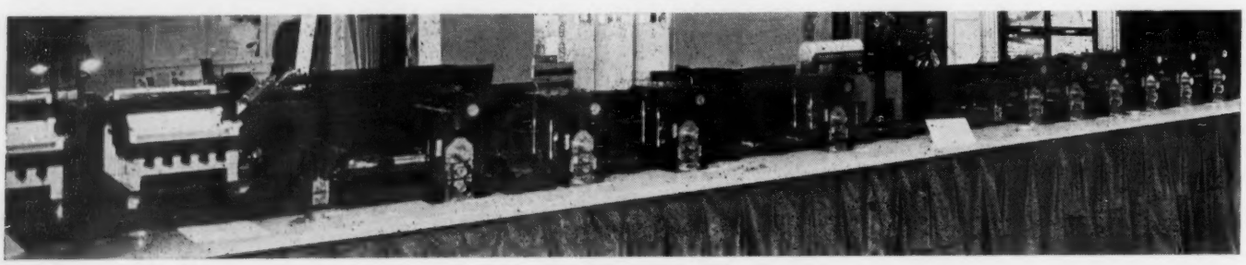
Policy Needs Revision

Said Mr. Shaner further: "From our experience of two years we should realize that we should revise our government policy as rapidly as possible in order that it may go with the current of the healing features of natural forces. Is it not time that we cease—in our government policies—to buck the current of economic laws?"

Upon the ferrous metal industries government policy has definitely influenced prices, he contended. It has prevented them from responding freely to the normal forces of supply and demand. Mr. Shaner said further:

"Spokesmen for the administration have stated on numerous occasions that one of the primary objectives is to restore prices to the level of 1926. During the two years in which the present policies have been in effect, prices of many ferrous metals have risen from about 75 per cent to approximately 90 per cent of 1926 quotations.

"Obviously the principal agency responsible for this increase is NRA. Under its provisions, codes of fair which, under the guise of meeting an



This complete working model of the new continuous hot strip mill of the Youngstown Sheet & Tube Co., recently completed at its Youngstown, O., mill and described in STEEL *for April 29, page 42, actually reduced tiny slabs to sheets at the convention of the National Association of Purchasing Agents in New York last week. Erected on a scale of ¾-inch to the foot, and 26 feet long, the model was finished 2½ months after receipt of specifications. Every portion of the mill from heating furnaces to finishing rolls is faithfully duplicated on a miniature scale*

acute emergency, introduced numerous artificial factors. Minimum wages and maximum hours were pegged, thus legalizing the spread-work idea which previously had been adopted voluntarily and unofficially by many units in the steel industry. This feature of NRA alone added $95,000,000 to the industry's labor cost in the first year of its code of fair competition.

"Still another feature of NRA which interfered with natural laws was the ban on the construction of new iron-making and steel producing capacity. According to the code, the construction of blast furnaces, and open-hearth, bessemer and electric furnaces for making steel was prohibited.

"This ban, while seemingly insignificant at the time, really has been an obstacle to the free development and expansion of the industry. It has prevented the building of new capacity keyed to new markets. It has shifted the expansive urge of the industry from the channels of iron and steel production capacity into the field of finishing capacity.

New Finishing Mills Profit

"In this connection, it is significant that the greatest boon to consumers of finished rolled steel during the depression years has come about through the development of broad, continuous strip mills. Much of the advantage of these advanced mills has been passed on to the consumer in the form of lower prices. But at the same time it is noteworthy that these mills have been profitable for the producers. The six steel producing companies which made the best financial showing in 1934 were companies which had operated broad strip mills.

"In view of this fact, it is reasonable to ask whether or not it is wise to restrict the expansion of iron and steelmaking capacity. Is it not likely that, given the same freedom to capitalize on improved open-hearth furnace design and construction as has been accorded the operators of continuous mills, producers and consumers would receive the same benefits?'

A luncheon meeting of the iron and steel group, held Wednesday, was devoted largely to a discussion of alloy steels. W. W. MacMillen, director of purchases, National Malleable & Steel Castings Co., Cleveland, presided.

Alloys Used Extensively

William J. Priestley, vice president, Electro-Metallurgical Corp., speaking on "Old and New Alloys," declared that the present decade will be notable in the history of the steel industry for two reasons: first, because it has registered the low point in ingot production and, second, because it marked a new era in which broader uses were found for alloy steels.

To show the wide application of stainless steels, Mr. Priestley quoted a prominent steel man as follows:

"The average citizen . . . . will be surprised to learn how intimately these products are associated with his daily life and how much his welfare is improved by the developments of these steels. He probably cleans his teeth with a tooth paste which, for sanitary purposes, has been mixed and prepared in stainless steel equipment. His razor blade is made of high chromium steel to prevent rusting. His morning paper has been produced by processes which use stainless steels extensively. His coffee cream and milk have been pasteurized in stainless steel equipment and

Donald G. Clark

President of the National Association of Purchasing Agents, who presided at the twentieth annual international convention and inform-a-show. He is purchasing agent for Brown & Sharpe Mfg. Co., Providence, R. I.

probably transported in stainless steel tanks to avoid contamination and bacteria. The butter, cheese and other dairy products which he consumes daily are practically all processed in stainless steel equipment.

"Even the water which he drinks probably has been pumped through stainless steel pumps, and the very light he uses has been generated by steam turbines which have stainless steel blades.

"If he goes to an up-to-date restaurant or hotel, he will eat food cooked in stainless steel equipment and probably will use stainless steel tableware.

"If he is unfortunate enough to have to undergo a surgical operation he will recline on a stainless steel operating table. The anesthetic probably will have been processed in stainless steel equipment, and his surgeon will use stainless steel instruments, sterilized in stainless steel vessels, all for the express purpose of protecting him from infection due to the difficulty of keeping such equipment scientifically clean if it is corrodible."

Mr. Priestley then prescribed in detail the uses and compositions of alloy steels best suited for industrial purposes.

Stanley A. Knisely, manager of sales promotion and advertising, Republic Steel Corp., speaking on "High Hat Steel and How It Is Sold," described certain features of the merchandising problems involved in developing markets for alloy steels. An abstract of his address will be presented in an early issue.

One session was devoted to the discussion of purchasing methods. E. G. Wertheimer, purchasing agent, Federated Metals Corp., Detroit, emphasized the importance of carefully grading and preparing nonferrous metal scrap. He declared that the profit obtainable justifies unusual care in this regard and advocated that sellers guarantee the quality or grade of their product.

Problems involved in purchasing from a central office for requirements in scattered branch plants were discussed by B. S. Stephenson, vice president in charge of purchases, American Radiator & Standard Sanitary Corp., New York.

Sees Billions Spent

W. E. Campbell, chairman of the business survey committee of the association, declared an era of industrial spending unequaled since the depression set in six years ago will put billions of dollars in circulation during the next year.

This statement, he said, was a conservative estimate based on a survey of present and contemplated commitments to be made by the corporate consumers who purchase from three-fourths to five-sixths of all the durable goods produced.

"Purchasing agents who have refused to be stampeded by 'buy now' drives, threats of impending inflation and other movements which ranged from simple appeals to hysterical demands to bring back prosperity by liberal spending, feel that the next phase of the postwar cycle will bring expansion of business with stiffening of prices, for the world recovery is well under way, and the log jam in industry in this country is also giving way."

Establishment of fair standards to improve the relations of scrap iron dealers and producers of scrap, in the merchandising of scrap, was urged by Richard Bonomo, of L. Schiavone & Bonomo Bros., Jersey City, N. J. Mr. Bonomo, who is the president of the New Jersey chapter of the Institute of Scrap Iron and Steel, claimed that direct dealing between producers and consumers of scrap worked against the best interests of the producers.

Industrial Men in the Day's News

Joseph C. Snyder, Vice President, Pullman-Standard Car Mfg. Co.

Born in Richmond, Va., he has spent much of his life there and in nearby Washington.

A background of 13 years with the New York Central buttresses his experience in the supply field.

Now in Cleveland, he is in charge of the central division for Pullman's carbuilding subsidiary.

JOSEPH C. SNYDER, vice president of the Pullman-Standard Car Mfg. Co. in charge of the central district, who opened headquarters in Cleveland May 1, has been a career man in railroading and car manufacturing.

A native of Richmond, Va., he became associated with the New York Central railroad in New York in 1898, advancing from a clerical position to assistant purchasing agent. In 1914 he embarked in the railroad supply business as vice president of the Pearsall Co., Washington, in charge of southern territory. Four years later he was made vice president of the Liberty Car & Equipment Co., remaining in Washington.

Mr. Snyder returned to his home city of Richmond in 1921 as vice president of the Richmond Car Corp., with supervision of sales and production. In 1928, when the Standard Steel Car Corp. acquired the Richmond company, he continued in the same capacity at Richmond.

Two years later he was promoted to the general offices of the Standard company at Pittsburgh, in charge of central district sales. When the name was changed on Jan. 1, 1935, to the Pullman-Standard Car Mfg. Co. Mr. Snyder remained as a vice president, and on May 1 he opened Cleveland offices at 907 Midland building, as vice president in charge of the central district.

Mr. Snyder is a member of the Railroad, Pittsburgh Traffic and the Shannopin country clubs of Pittsburgh, and the Country Club of Virginia, at Richmond.

F. W. SKUSA, for 22 years with Oldsmobile and Chevrolet divisions of General Motors Corp., will be in charge of the recently-reopened Muncie Products division of the corporation, Muncie, Ind., where 1200 are now being employed in production of truck transmissions.

William J. Lampert, active with General Motors in St. Louis, Tarrytown, N. Y., Atlanta and Detroit offices, is comptroller at Muncie, and will be assisted by Paul K. Hennessey, general auditor from the Chevrolet commercial body works in Indianapolis.

R. D. Stewart will have charge of the purchasing department at Muncie. Hubert L. Jones will be material supervisor; L. R. Burger, traffic manager.

♦ ♦ ♦

William B. Cooley, formerly general sales manager of the Hevi Duty Electric Co., Milwaukee, has been appointed by Michiana Products Corp., Michigan City, Ind., to handle sales of the company's heat and corrosion-resistant alloy castings in the Indiana territory, with headquarters at 433 North Capitol avenue, Indianapolis.

Paul S. Menough, formerly associated with Michigan Steel Castings Co., Detroit, will represent Michiana Products in Pennsylvania, with offices in the Chamber of Commerce building, Pittsburgh.

♦ ♦ ♦

Herbert J. Winn, president of Taylor Instrument Cos., Rochester, N. Y., has sailed for London on a five-week business trip.

♦ ♦ ♦

Paul E. Shwab has been elected vice president and secretary-treasurer of Kerrigan Ornamental Iron Works Inc., Nashville, Tenn.

♦ ♦ ♦

George L. Herzog has been named purchasing agent for the Philadelphia Rapid Transit Co., Philadelphia, effective June 1, succeeding W. L. Maize, retired. Mr. Herzog has been assistant purchasing agent.

♦ ♦ ♦

Robert T. Caldwell, counsel for American Rolling Mill Co., Ashland, Ky., and C. H. Murray, assistant to the president at Middletown, O., have been named advisers to official delegates from this country to the International Labor Conference at Geneva, Switzerland, which opens June 3. These selections were made by the American Iron and Steel institute.

A. M. Candy

Arc welding authority, who as noted in STEEL for May 27 has been appointed consulting engineer on the staff of the Hollup Corp., Chicago, manufacturer of welding wire and supplies

♦ ♦ ♦

Ralph R. Day, formerly sales engineer in the Chicago and Middle West territory for Cleveland Worm & Gear Co., has been appointed Ohio representative for the Bartlett Hayward Co., Baltimore, in sales of

Fast's coupilngs. His headquarters will be in Cleveland.

♦ ♦ ♦

Richard Kraus has been elected president of the Aluminum Wares association, Pittsburgh. R. S. Blake is vice president. S. J. Swensson is secretary-treasurer.

♦ ♦ ♦

Harry D. Carson, president, Carson Marshall & Co., Philadelphia pig iron and coke merchant, has been elected a director of the Philadelphia Rotary club.

♦ ♦ ♦

Charles D. Klime has been appointed head of a newly established branch of the Tennessee Coal, Iron & Railroad Co.'s farm marketing service in Florida, with offices in Orlando.

L. E. Farmer directs a new Georgia branch at Atlanta. Paul R. Aycock heads a new Tennessee branch at Knoxville. Robert E. Hays has charge of a new Mississippi branch at Clinton. The four will work under direction of Dr. M. F. Jackson, head of the company's farm division.

♦ ♦ ♦

R. S. Archer, chief metallurgist, Chicago district, Republic Steel Corp., has been nominated for president of the American Society for Metals, nomination virtually assuring election at the National Metal Congress in Chicago this fall.

E. C. Bain, assistant to the vice president in charge of metallurgy and research, United States Steel Corp., New York, has been nominated for vice president of the society. W. P. Woodside, vice president in charge of research, Climax Molybdenum Co., Detroit, has been nominated for treasurer; R. L. Kenyon, supervising research engineer, American Rolling Mill Co., Middletown, O., and S. C. Spalding, assistant metallurgist, American Brass Co., Waterbury, Conn. for trustees.

Died:

MARCUS T. LOTHROP, 49, former president of Timken Roller Bearing Co. and chairman of Timken Steel & Tube Co., Canton, O., in that city, May 23. He started with Timken in 1911 as metallurgist, later becoming vice president and general manager in charge of operations and sales, and finally succeeding H. H. Timken as president in 1929. Early in 1932 he resigned from the company. Born in Buffalo and a graduate of the University of Michigan, Ann Arbor, Mich., before his association with Timken he was identified wth R. H. Bulley as consulting metallurgical engineer at Syracuse, N. Y.

♦ ♦ ♦

R. T. McGlynn, 39, vice president of the Merchants Steel & Supply Co., Chicago, in that city, May 26. He had been identified with the company for 21 years, serving as vice president for the past 14 years.

♦ ♦ ♦

Walter F. Bachelder, secretary, George W. Prentiss & Co., Holyoke, Mass., May 23.

♦ ♦ ♦

J. Keese Hallock, 61, special representative at Pittsburgh of the Universal Portland Cement Co., in Norwalk, Conn., May 24.

♦ ♦ ♦

Heinrich Wiehagen, 77 retired veteran employe of the Braddock works of American Steel & Wire Co., in North Braddock, Pa., May 27.

♦ ♦ ♦

Howard M. Brooks, 49, vice president of the Alabama Fuel & Iron Co., Birmingham, Ala., in that city, May 19. He had held this position with the Alabama company since 1929.

♦ ♦ ♦

Lawrence L. Minor Jr., 48, sales manager and director of Spang, Chalfant & Co. Inc., in Pittsburgh, May 29, from injuries received in an automobile accident. Born in Uniontown, Pa., he had been identified with Spang, Chalfant since 1910.

♦ ♦ ♦

Charles J. Davidson, 67, authority on steam engineering, in Milwaukee, May 26. He was chief engineer of the Milwaukee Electric Railway & Light Co. from 1909 to 1915, resigning to engage in consulting engineering work at Chicago and retiring in 1930 because of failing health.

♦ ♦ ♦

Earl W. Gardner, 62, for many years purchasing agent for the York Ice Machinery Corp., York, Pa., May 23. Coming to the York organization in 1897, he served as purchasing agent for 38 years and was closely associated with the late Thomas Shipley, under whose management the company expanded steadily.

♦ ♦ ♦

Paul Labbe, president of Societe des Acieries de Longwy, leading French iron and steel interest, in Paris, May 14. He was also a member of the directing committee of the Comite des Forges de France; president of Societe Francaise Metallurgique (Procedes Griffin); a director of Societe Louvroil et Recquignies, tube manufacturer; president of Societe de Moutiers, iron ore mining company; a director of Ateliers de Construction du Nord de la France et des Mureaux, and vice president of Societe des Mines de Valleroy.

♦ ♦ ♦

Nicholas A. Becker, 60, vice president of the Judson Iron Works, Pittsburgh, Calif., at his home in Oakland, Calif., May 18. He had been active in Pacific coast steel business for many years being a former general superintendent of the Columbia Steel Co. plant. Born in Belleville, Ill., he went to California in 1919 to direct construction of Columbia's rolling mill at Pittsburgh. Later he took charge of the building of a wire and nail mill, sheet mill, tin mill, machine shops and No. 2 open-hearth unit. For a time he was associated with the Consolidated Steel Corp. of Mexico.

Frank C. Moyer

Who has been appointed general manager of sales for the American Shear Knife Co., Pittsburgh, as noted in STEEL for May 20. Formerly vice president and general manager of sales in the Detroit offices of Heppenstall Co., his headquarters will continue to be in Detroit

Foreign Trade

IMPORTS of iron and steel reached a total of 28,786 tons in April, compared with 21,409 tons in March, and 26,862 tons in April, 1934. Total for the first four months was 101,884 tons, against 113,292 tons in same period of 1934.

Labor

THE "rank-and-file" insurgents of the Amalgamated Association of Iron, Steel and Tin Workers last week rejected the so-called peace offers of President Michael F. Tighe and the executive board of the Amalgamated. They announced that they would continue their efforts to organize the unorganized steel industry:

"The national emergency committee is continuing its organizing drive, despite the executive board or any offers. Organization is what the rank and file has fought for and will continue to fight for—one that will win better wages, better working conditions, and recognition of the Amalgamated association for the workers who run it. With steel workers joining in growing number, we are steadily approaching this, our goal."

Activities of Steel Users and Makers

LOUIS ALLIS CO., Milwaukee, electric motors, has appointed Harris-Green Co., 1101 Farmers Bank building, Pittsburgh, its engineering-sales representative in western Pennsylvania. Harris-Green Co. was organized recently by G. N. Harris and J. G. Green, long connected with an electrical manufacturer in the Pittsburgh district. Associated with them is Henry Harris, organizer of the United Electric Light Co., Wilmerding, Pa., and general contracting manager of the Duquesne Light Co. He is a past president of the Pennsylvania Electric Light association and former president of the National Electric Light association.

♦ ♦ ♦

Crowell & Murray Inc., Cleveland, industrial chemist specializing in iron ore, has moved its office and laboratory to 806 Perry-Payne building.

♦ ♦ ♦

Amerlux Steel Products Corp., New York, has moved its offices to room 720, Lincoln building, 60 East Forty-second street.

♦ ♦ ♦

Semet-Solvay Co. and its subsidiaries have removed their offices from 61 Broadway, New York, to 40 Rector street.

♦ ♦ ♦

Lubrication Products Co., Cleveland, has moved its main offices from 1531 to 1400 West Twenty-fifth street, where larger space is available to care for increased business.

♦ ♦ ♦

R. K. LeBlond Machine Tool Co., Cincinnati, has established a direct sales office at 20 North Wacker Drive building, suite 1572, Chicago, in charge of B. N. Brockman, western sales manager.

♦ ♦ ♦

Pacific Coast Steel Corp., San Francisco, subsidiary of Bethlehem Steel Co., has opened offices at 924 Kearns building, Salt Lake City, Utah. D. W. Stephens is district manager in charge.

♦ ♦ ♦

Lukens Steel Co., Coatesville, Pa., and its divisions, By-Products Steel Corp. and Lukenweld Inc., have moved their New York offices from 17 Battery place to 2714 Chrysler building, 405 Lexington avenue.

♦ ♦ ♦

Homestead Valve Mfg. Co., Coraopolis, Pa., has appointed R. M. Thaxton, 116 Cumberland avenue, Syracuse, N. Y., its new exclusive valve representative in 16 counties, comprising the southeastern section of New York state.

♦ ♦ ♦

Cliffs-Dow Chemical Co., has been formed to manufacture chemicals from wood by Dow Chemical Co., Midland, Mich., and Cleveland-Cliffs Iron Co., Cleveland. Operations will be conducted at Marquette, Mich., where the Cleveland-Cliffs company has had a plant for 20 years. Both companies have been carrying on research in this line for several years. Willard Dow has been elected president, E. B. Greene vice president, E. W. Bennett treasurer, V. P. Geffine secretary, and E. T. Olson general manager. Drectors representing Dow interests are: Messrs. Dow and Bennett. M. E. Putnum, L. I. Doan and C. J. Strosacker; for Cleveland-Cliffs, Messrs. Greene, Geffine and Olson, William G. Mather and A. C. Brown. Authorized stock includes $2,500,000 in A preferred, 10,000 shares of B preferred and 25,000 shares common. Amount to be issued at once is not stated but a portion will be marketed to provide funds for development.

♦ ♦ ♦

Leeds & Northrup Co., Philadelphia, and George Kent Ltd., London, Eng., have perfected an agreement applying to sale of industrial electrochemical instruments and certain types of flowmeters. Under this agreement Kent will not offer its in-

(*Please turn to Page* 83)

First Quarter Steel Output Under Code

Compiled by American Iron and Steel institute from reports by 209 companies; in comparable period, 1934, total production was 5,200,555 gross tons of steel products, with 36.6 per cent of capacity engaged

		Number of companies	Items	Annual Capacity Gross tons	First Quarter 1935			
					Production For Sale	Per cent of capacity	Shipments: Export	Shipments: To members of the Iron and Steel Code for conversion into Code products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	39	1	xxxxxxxx	1,143,025	xxx	19,715	1,030,393
	Heavy structural shapes	14	2	5,440,820	257,343	18.9	9,128	-
	Steel piling	5	3	270,000	24,859	36.8	1,904	-
	Plates—Sheared and Universal	27	4	6,220,755	304,695	19.6	10,981	1,642
	Skelp	11	5	xxxxxxxx	76,124	xxx	1,789	56,900
	Rails—Standard (over 60 lbs.)	7	6	4,850,000	151,085	12.5	1,775	-
	Light (60 lbs. and under)	8	7	775,820	12,436	6.4	422	-
	All other (Incl. girder, guard, etc.)	2	8	140,000	5,037	14.4	301	-
	Splice bar and tie plates	19	9	1,622,393	56,180	13.9	714	-
	Bars—Merchant	46	10	xxxxxxxx	653,470	xxx	13,161	69,295
	Concrete reinforcing	37	11	xxxxxxxx	96,628	xxx	2,134	-
	Cold finished—Carbon	19	12	xxxxxxxx	125,560	xxx	1,303	-
	Alloy—Hot rolled	18	13	xxxxxxxx	138,337	xxx	849	11,930
	—Cold finished	14	14	xxxxxxxx	14,323	xxx	52	-
	Hoops and baling bands	6	15	xxxxxxxx	10,614	xxx	115	-
	TOTAL BARS	73	16	13,087,907	1,038,932	31.8	17,614	81,225
	Tube rounds	6	17	xxxxxxxx	15,714	xxx	-	10,999
	Tool steel bars (rolled and forged)	17	18	106,321	7,646	28.8	423	-
	Pipe and tube—B. W.	15	19	1,906,786	114,529	24.0	8,326	-
	L. W.	10	20	1,726,734	57,849	13.4	3,625	-
	Electric weld	4	21	819,571	14,186	6.9	100	-
	Seamless	15	22	2,520,978	175,933	27.9	8,973	-
	Conduit	6	23	142,350	9,614	27.0	-	-
	Mechanical Tubing	5	24	212,050	20,237	38.2	1,543	-
	Wire rods	19	25	xxxxxxxx	125,736	xxx	4,996	60,665
	Wire—Drawn	48	26	1,804,976	226,785	50.3	8,476	2,518
	—Nails and staples	26	27	1,181,587	92,799	31.4	3,455	-
	—Barb., fence, bale ties, fence posts, etc.	27	28	1,590,739	111,250	28.0	7,940	-
	Black plate	15	29	408,879	67,829	66.4	1,893	23,111
	Tin plate	17	30	2,648,256	391,354	59.1	46,196	-
	Sheets—Hot rolled	25	31	xxxxxxxx	314,223	xxx	5,047	22,184
	Hot rolled annealed	25	32	xxxxxxxx	383,481	xxx	10,937	1,079
	Galvanized	19	33	xxxxxxxx	178,577	xxx	19,567	-
	Cold rolled	20	34	xxxxxxxx	443,921	xxx	8,294	-
	All other	17	35	xxxxxxxx	99,672	xxx	1,788	-
	TOTAL SHEETS	37	36	7,706,967	1,419,874	73.7	45,633	23,263
	Strip—Hot rolled	35	37	3,424,052	545,363	63.7	9,287	61,855
	Cold rolled	41	38	1,011,754	146,542	57.9	1,902	-
	Wheels (car, rolled steel)	6	39	398,284	26,756	26.9	6,784	-
	Axles	9	40	441,900	6,072	5.5	1,458	-
	Track spikes	12	41	345,760	13,394	15.5	202	-
	All other	6	42	21,207	2,817	53.1	1,094	-
	TOTAL CODE STEEL PRODUCTS	181	43	xxxxxxxx	6,661,995	xxx	226,649	1,352,571
	Estimated total steel finishing capacity based on a yield from ingots of 69.4 %		44	47,040,900	xxxxxxxx	45.1	xxxxx	xxxxxxxx
	Pig iron, ferro manganese and spiegel	32	45	xxxxxxxx	678,759	xxx	694	272,588
	Ingot moulds	5	46	xxxxxxxx	66,410	xxx	991	-
Iron Products	Plates	2	47	32,260	296	3.7	-	-
	Skelp	1	48	-	918	-	271	647
	Bars	14	49	241,919	11,520	19.0	3	460
	Splice bars and tie plates	1	50	50,000	1,556	12.4	-	-
	Pipe and tubes	5	51	231,153	9,062	15.7	60	-
	Sheets	2	52	18,000	2,936	65.2	-	-
	All other	5	53	53,300	2,652	19.9	-	-
	TOTAL IRON PRODUCTS (ITEMS 47 to 53)	22	54	568,672	28,940	20.4	334	1,107

EDITORIAL

A Great Spiritual Victory, With New Responsibilities!

June 19, 1215—King John of England granted Magna Charta to the barons.
July 4, 1776—Declaration of Independence signed.
Sept. 17, 1787—United States constitution ratified.
September, 1789—United States Supreme Court created.
Dec. 15, 1791—Ten original amendments to constitution, including fifth amendment, became effective.
Nov. 19, 1863—President Lincoln delivered Gettysburg address, which concluded with these words:
"... *We here highly resolve .... that this nation, under God, shall have a new birth of freedom—and that government of the people, by the people, for the people shall not perish from the earth.*"
May 27, 1935—Supreme Court, in three sweeping unanimous decisions, upheld the resolution of Lincoln and gave notice to the world that American constitutional government still lives.

MAY 27, 1935, will go down in history as the date of one of the most significant events in the evolution of the American conception of a democratic form of government.

Nine justices of the Supreme Court—ably representing both conservative and liberal schools of jurisprudence—concurred in three decisions which deal a death blow to many of the unsound policies and practices of the new deal.

In ruling that the Chief Executive did not have the power to remove the late William E. Humphrey from the federal trade commission, the court served notice that the independence of quasi-judicial federal bodies cannot be trifled with under the constitution—particularly by a President who resorts to political subterfuge "to make more effective the purposes of the administration."

Rulings Remind Congress That Constitution Cannot be Shelved in Time of Emergency

In voiding, without a dissenting voice, the Frazier-Lemke farm mortgage moratorium act, the Supreme Court reminded congress that the dozen words at the end of the fifth amendment —"Nor shall private property be taken for public use without just compensation"—mean exactly what they say and that they are as effective today as when they were written into the constitution 144 years ago.

In ruling out NIRA on several counts of unconstitutionality, the nine justices performed the great service of shocking the entire nation into a realization of the extent to which the new deal has violated the tenets of the constitution. Their unanimous decision spells the end of the pyramiding of bureaucratic power. It dashes the dreams of those who hoped for a dictatorship manipulated by brain trusters. It destroys the system, which during the past two years, permitted immature collegians clothed with government authority to tell experienced veterans in industry and finance how to conduct their affairs. It warns congress that the slovenly manner in which it has performed its legislative functions during the past two years is not to be countenanced, even under the mitigating circumstances of a national emergency. It serves notice upon the President that such exceptional and additional powers as he may demand to meet a critical situation must conform to the clearly defined provisions of the constitution.

But even more important than any of these results is the spiritual uplift which has been given to the American people by the demonstration, provided by the three decisions, that the system of checks and balances between the administrative, legislative and judicial arms of the government—so carefully planned by the writers of the constitution—still is operative. Today millions of Americans are giving thanks to those statesmen whose foresight gave to this modern age a charter so ideally adapted to its vexing problems.

In Long Run, Supreme Court Decisions Will Stimulate Confidence, Aid Recovery

The court's decisions mean much to American industry. They mean that after the initial readjustments are made, business can go ahead with more confidence. The long-term benefits are incalculable.

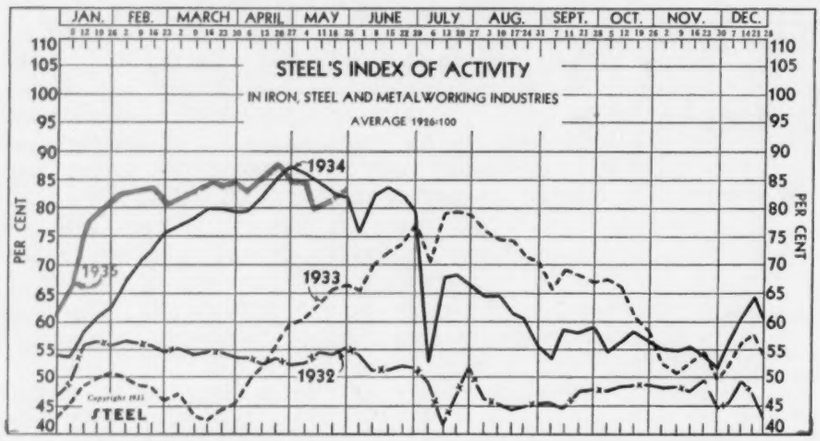
However, industry, in its rejoicing over a great victory, should not overlook the new responsibilities which are incurred under the terms of the decisions. All NIRA codes are out. Every company is released from the restraints which were imposed by codes.

Industrial executives will do well to go extremely slow in effecting any changes from the present established rules of business conduct. Do not jeopardize prospective benefits of the newly won freedom by abusing its privileges.

Trade associations undoubtedly will attempt to carry on the work of code authorities under voluntary agreements among their members. Every company should endeavor to continue to co-operate as in the past until legislation or other developments reveal what the future program will be.

This is no time to rock the boat!

THE BUSINESS TREND



STEEL's *index of activity in the iron, steel and metalworking industries gained* 2.1 *points to* 82.6 *in the week ending May* 25:

Week ending	1935	1934	1933	1932
Mar. 30	84.3	79.3	45.2	53.4
April 6	83.4	79.6	49.1	52.6
April 13	85.4	82.2	52.6	53.4
April 20	26.3	85.0	55.8	52.3
April 27	84.9	87.5	59.5	52.5
May 4	84.6	86.0	60.3	54.7
May 11	79.3	84.4	62.5	54.3
May 18	80.5†	82.4	65.2	55.1
May 25	82.6*	81.9	66.1	54.2

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL*). Average for* 1926 *equals* 100, *weighted as follows: Steel rate* 40, *and car loadings power output and auto assemblies each* 20.

Industry Watches for Effect Of Decisions on Business

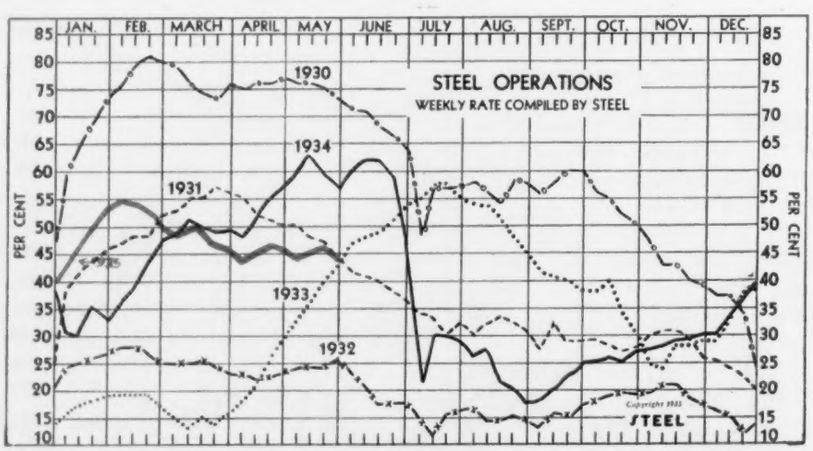
ANY comment upon the trend of business must take into account the readjustments which inevitably will be necessitated by the important decisions handed down last Monday by the Supreme Court.

Those who believe that the activities of Wall street constitute a sensitive and accurate barometer of the effect of significant events, such as the decisions of the highest court, found scant satisfaction in the gyrations of the stock market last week. The initial reaction Monday afternoon was a quick, sharp rise in securities. This continued in the opening hours Tuesday, but was followed by a slump, in which sales for the day exceeded two million shares. It was not clear whether the break was due to second thoughts on the NRA decision, or to the tense financial situation in Paris. The behavior of the market on Wednesday was similarly vague as to clues.

It will take time to determine the effect of the decisions. A softening in prices in some industries seems inevitable, especially if buyers hold back to see the effect of the removal of code restraints. On the other hand, the decisions sooner or later will encourage the resumption of long-term commitments, which should help the capital goods industries.

Meantime, in the interval of waiting, industrial activity is marking time. Gains were registered in the week preceding the decisions, due to a sharp rebound in automobile assemblies and steadiness in car loadings and power output. Steel operations slipped fractionally.

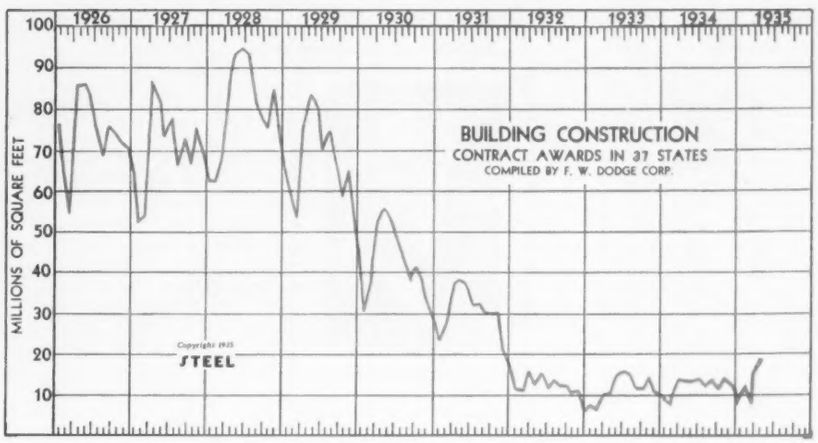
1935	Per Cent
May 25	44
May 18	44.5
May 11	44.5
May 4	44
April 27	46
April 20	46
April 13	45
April 6	44
Mar. 30	45
Mar. 23	46
Mar. 16	48
Mar. 9	50
Mar. 2	48



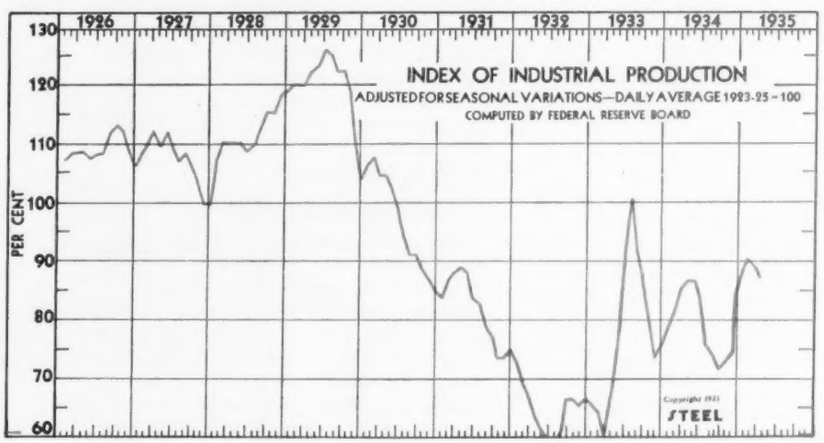
1934	Per Cent
May 26	57
May 19	59
May 12	62
May 5	60
April 28	57
April 21	55
April 14	51
April 7	48
Mar. 31	49
Mar. 24	49
Mar. 17	50
Mar. 10	51
Mar. 3	48

April Building Trend Highest Since 1931

	Square Feet	
	1935	1934
January	11,245,100	9,568,700
February	9,670,300	8,176,300
March	15,873,100	14,788,900
April	19,981,100	14,207,100
May		14,664,400
June		13,986,500
July		13,250,000
August		14,259,000
September		12,510,300
October		15,098,100
November		12,780,800
December		9,193,300



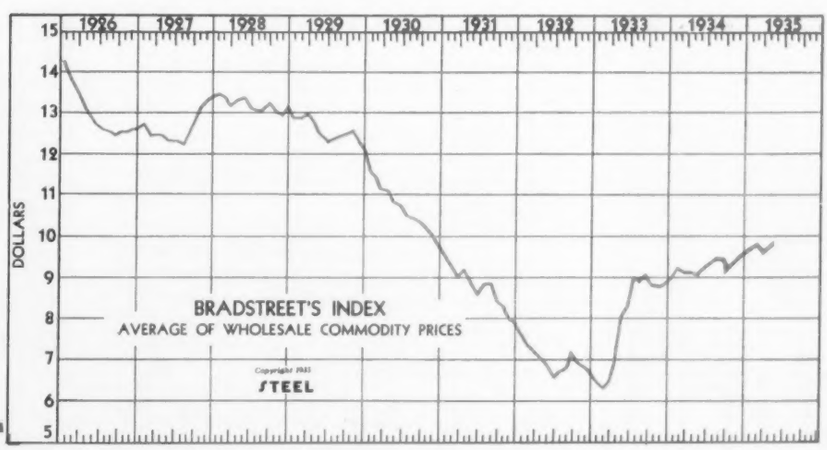
Industrial Production Declines in April



	1935	1934	1933
January	91	78	65
February	89	81	64
March	88	84	60
April	86	85	67
May	....	86	77
June	....	83	91
July	....	75	100
August	....	73	91
September	....	71	84
October	....	73	77
November	....	74	73
December	....	86	75

Bradstreet's Index Points Upward on May 1

	1935	1934
January 1	$9.49	$9.01
February 1	9.78	9.26
March 1	9.79	9.17
April 1	9.66	9.16
May 1	9.79	9.14
June 1	.....	9.24
July 1	.....	9.32
August 1	.....	9.48
September 1	.....	9.45
October 1	.....	9.27
November 1	.....	9.29
December 1	.....	9.49



To Buy or Not To Buy?

CHARLES J. STILWELL,

Vice President, Warner & Swasey Co.,
Cleveland

SAYS:

YOU have raised the question with me as to whether a representative and progressive metalworking establishment *can afford not* to buy machine tools of the latest design.

Generally speaking, and without much question, I should say the answer is "no." There are those manufacturers, however, while not questioning the principle, raise some objection to the absolute uniformity in the meaning of the term "obsolescence." They maintain that just because a tool is, say, 25 years old, is not in itself the final reason why the tool should be regarded as entirely obsolete.

Performance Is Gage

The subject must be treated fairly, of course, and a machine tool cannot always be regarded as obsolete simply because it is old in the number of years it has been in operation, and particularly so if it is still performing its function efficiently and satisfactorily. There are occasional instances where machine tools are being used in which the machines themselves have long ago lost their original accuracy, but they may still be employed as "pushers" or drivers for certain special holding tools or devices in which all of the up-to-date required accuracy may be built into the special tool itself.

So long as the machine provides sufficient and efficient power, and so long as it is in good operating condition, it may well continue to be a useful manufacturing unit and may not necessarily fall in the category of obsolete tools.

Included in our own plant equipment, for instance, are a number of lathes installed more than 25 years ago. They are used for performing some half-dozen machining operations which are not of a production character, and in which operations skill of the operator is the chief factor. One such operation, for example, is the cutting of threads of certain spindles. For such operations these machines are entirely satisfactory and could not be replaced with economical justification.

Adapting Old Equipment

Other factors are involved when considering the proposition of purchasing new tools. In numerous instances ingenuity on the part of the metalworking company enables it to adapt its old equipment in solving new production problems. As an illustration, one company recently sawed an old engine lathe in half and moved the ends apart. It now is using this machine with entire satisfaction for machining Kelly bars, in lengths up to 30 feet, for the oil industry. In this case, an expenditure of about $1800 in adapting an old machine saved the large outlay of some $15,000 which would have been involved in installing a new machine tool to perform this operation.

Obsolescence does not depend entirely on age as measured by just so many years; in numerous cases machines built as recently as five years ago have outlived their economic usefulness. As we see it, the only correct approach to the problem of buying new equipment is from the standpoint of cost of production. Because new tools of today's design are capable of much higher speeds and are built with much greater rigidity, they justify themselves economically by getting out much greater production, with improved finish of the machined

" . . . . . Obsolescence does not depend entirely upon age as measured by just so many years; in numerous cases machines built as recently as five years ago have outlived their economic usefulness," says Mr. Stilwell, who is also president of the National Machine Tool Builders association. STEEL herewith presents the first of a series of articles planned to show the economic advantages of intelligent replacement of capital goods. Other leaders in the machine and equipment building industries will express their views in subsequent issues.

parts. It is for this reason they quickly pay for themselves in volume production lines.

Often the economies and other advantages obtained with new machines in production lines are so pronounced as to be startling. Recently the time of machining on a clutch housing and gear, for instance, has been cut at one shop from 124 to 38 minutes each. The cost per piece has been reduced from $3.10 to $0.95. Total savings per year in production of this piece, based on an 8-hour day, are $6801.20. This means a net profit of 122 per cent annually on the fully equipped turret lathe, costing $4775, which makes this economical production possible. A universal cross slide, a hexagon turret and rigid construction of the machine combine to make this showing possible. Use of the universal cross slide permits making six of the total 21 cuts at no cost. To go back to the original question, it is readily apparent that the manufacturer in this instance could not afford to be without the benefits of a new machine.

Case Studies Show Shavings

Many similar cases of greater and more economical production with improved machine tools may be cited. Machining of a brass impeller wheel which formerly took 4.15 hours per piece, has been reduced to 2.35 hours, including the set-up time. A drop forged crankshaft formerly machined in 20 minutes, now is being turned out in 12.7 minutes. Time in machining a cast iron handwheel has been reduced from 45 to 30 minutes. Framing cams that required 30 minutes now are machined in 16. A gear housing that formerly took 60 minutes is being machined in 40. A magnesium starter housing formerly requiring 29 minutes now is being machined in 19. In all the cases cited, new turret lathes were installed as replacements after it had been found that the new machine would pay for itself in a reasonable period, based on the old and the new costs.

Power, Speeds Increased

Why are the latest machines better than their predecessors?

They have more power, which permits fullest efficiency from the new cutting tools, such as cemented tungsten carbide and improved high-speed steel. Through the use of antifriction bearing mountings of main spindles, they make economical use of power and operate at much higher speeds. Because improved engineering steels and castings are obtainable, the new tools are much more rigid than anything hitherto possible, and their parts are much more resistant to wear. Through the use of these improved materials, the new machines can absorb greater power, at high speeds, without destruction of their initial accuracy.

From a design standpoint, also the new tools are superior. If an antifriction bearing on a spindle mounting should fail, for instance, the replacement of this bearing automatically will establish the new machine alignment; this is because replacement parts are finished to extreme accuracy. The hardened ways are protected from abrasion by aprons or other means of preventing chips and grit from falling into the sliding joints; they also prevent the lubricant from being washed away by the coolant. Another feature is that the new machines are lubricated more efficiently.

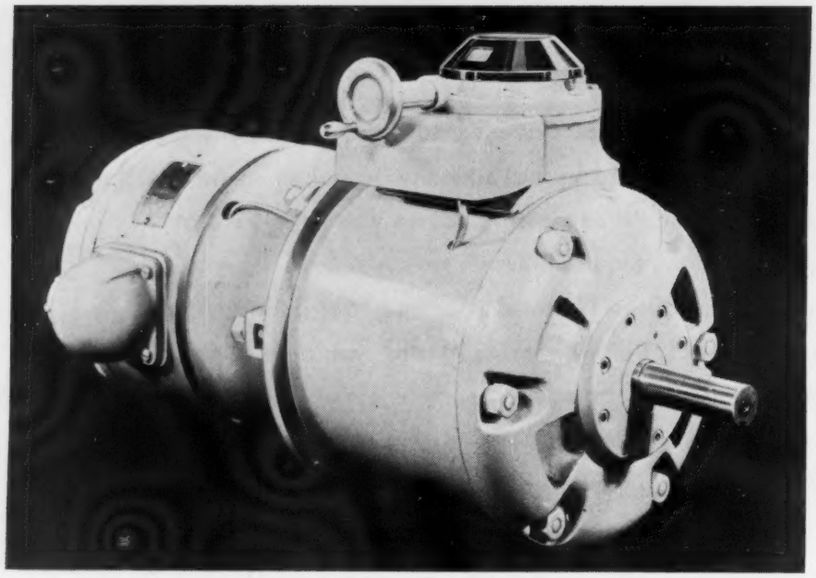


Fig. 1—Variable-speed power unit known as the Transitorq, comprising constant-speed motor built integrally with transmission. Speed control mechanism is mounted on top of the latter

Output Speeds Infinitely Adjustable in Gearless Power Transmission Unit

RECENT newcomer to the field of power transmission is a compact variable-speed power unit, comprising a constant-speed electric motor built as an integral unit (see Fig. 1) with a transmission, the output speed of which is infinitely variable over its entire range. It is designed and built by the New Departure Mfg. Co., Bristol, Conn., and will be known as the Transitorq.

In the unit, hardened steel rollers in pressure contact with equally hard steel races, Fig. 3, are utilized to transmit power. The principle upon which the device is founded, therefore, is basically that of all self-powered wheeled vehicles. A vital difference in the adaptation of this principle to the power unit, however, is that in the latter, it is recognized that the positive rolling contact of the rollers and races, or the traction of the one upon the other, will not be interrupted so long as the pressure of the rollers upon the races is proportional to the torque load or tractive force. Therefore, in the unit, an automatic pressure device is employed, which utilizes the imposed load itself to generate the required pressure between the rollers and races, thus insuring positive drive under all conditions, including extreme overload.

Rollers which transmit the drive from the constant speed input race to the variable speed output race are mounted in a nonrotatable spider, Fig. 2. Each roller, being carried upon a ball bearing, is free to revolve about its own axis and in addition may be rocked a limited distance about an axis at 90 degrees to it.

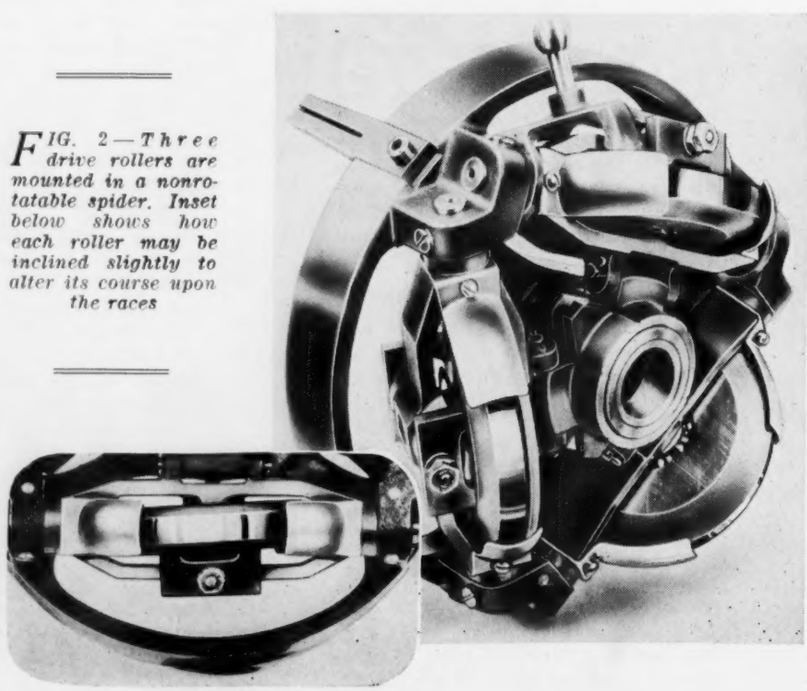


FIG. 2—Three drive rollers are mounted in a nonrotatable spider. Inset below shows how each roller may be inclined slightly to alter its course upon the races

As a result, the rollers may be adjusted to any position relative to the races from the lowest to the highest speed ratio positions, as shown in the sectional drawing, Fig. 7. Thus, in changing the position of the rollers with regard to the races, not only is the speed of the output race changed, but any speed within the limits of the low and high-speed roller positions may be obtained accurately.

Ratios Changed Easily

Since the contact pressure between the rollers and races is maintained in definite proportion to the imposed torque load, the rollers naturally cannot be forced from one ratio position to another. To accomplish a change quickly and easily, the bearings supporting the rollers are so designed as to permit the rollers to be inclined slightly in such a manner as to alter their course upon the races, as shown by the inset in Fig. 2. In this way, the rollers roll themselves into the required ratio positions and the effort necessary to accomplish this, even with the unit under full load, is no more than a finger touch on the speed control wheel. This inclined position of the rollers is assumed upon either manual or automatic operation of the speed control.

Speed control mechanism, mounted on top of the power unit, Fig. 1, comprises two principal parts which function separately or in conjunction with each other. The first part is the indicator dial, supported on a circular, vertically disposed housing which is rotated by a worm gear either locally operated by means of a small handwheel, or by remote control, through flexible shaft or selsyn motor-generator device.

The second part of the control is a rotor or vane within the circular housing and connected to a vertical shaft operating the roller shifting mechanism. When the power unit is started, oil under pressure from the pump enters the circular housing behind the vane and moves the latter around against spring pressure until it reaches a stop in the housing. The position of the stop depends upon whatever output speed the indicator may have been set for. With the power unit running, the vane is kept in contact with its stop hydraulically and operation of the handwheel rotates both parts as a unit, increasing or decreasing speed.

Should the power unit be stopped when set for any speed between high and low, the oil pressure immediately is relieved and the vane automat-

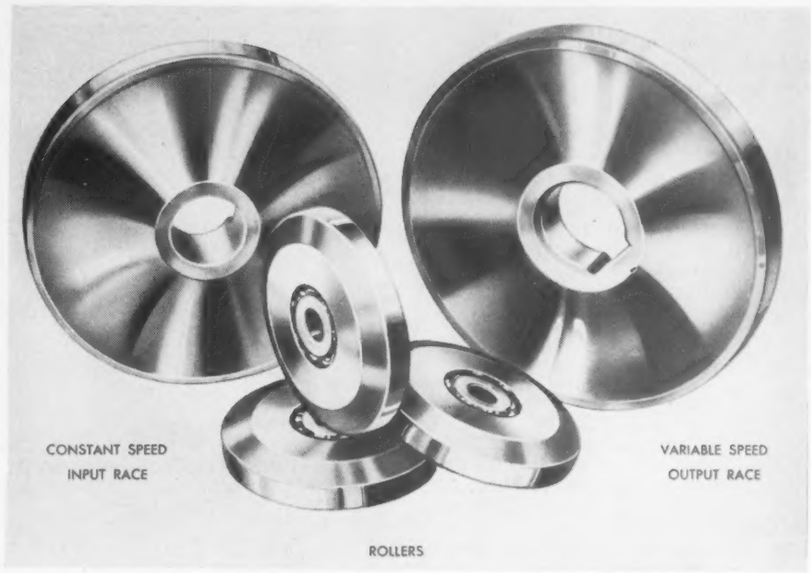


Fig. 3—Five main elements of the transmission, power being transmitted from the input race to the output race through the three rollers

FIG. 5 (right)—To insure contact pressure of rollers on races in proportion to imposed torque load, an arrangement of stationary and floating torque loading flanges is used, as shown in this subassembly. Rollers may be seen in the speed-increasing position

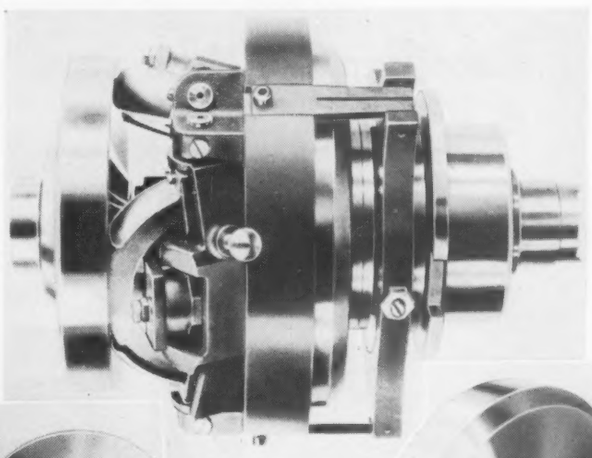
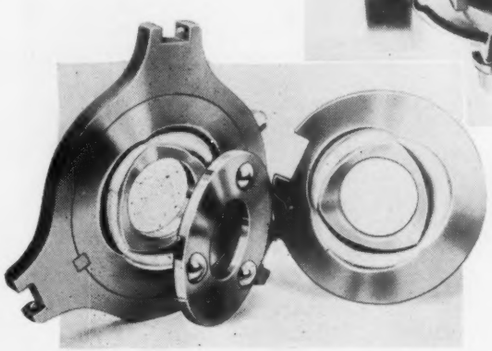
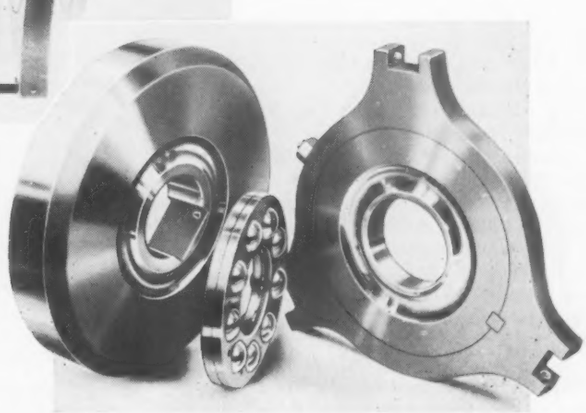


FIG. 4 (lower left)—From left to right: Floating torque loading flange, torque loading balls and stationary torque loading flange. Fig. 6 (lower right)—From left to right: Variable-speed output race, angular contact thrust bearing and floating flange





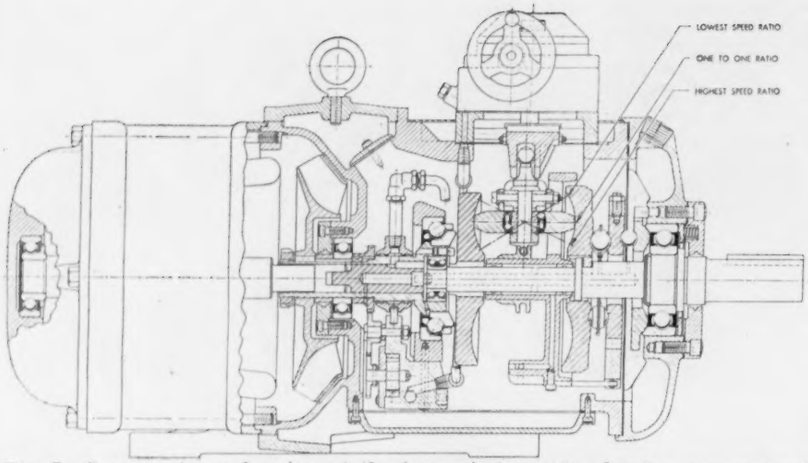


Fig. 7—Cross-sectional drawing of the transmission unit, showing arrangement of races, rollers, bearings and other parts

ically shifts back under spring pressure to the low speed starting position.

By means of an adjustable valve located on the speed control, the time required for the unit to change from low to any preselected speed may be varied to suit requirements. With the valve open full, the unit will accelerate from low to highest speed, or decelerate from high to low, in 3 seconds.

Controlling Contact Pressure

An interesting device is used for automatic control of roller contact pressure. As shown in Figs. 4, 5 and 6, it comprises an angular contact thrust bearing, a floating torque loading flange, three equispaced torque loading balls set in a separator or cage, and a stationary torque loading flange. The balls ride in three symmetrical inclined grooves, the latter being cut into both the stationary and floating torque loading flanges. Because of the ramp or cam formation of the grooves it is evident that a slight rotary movement of the floating flange in either direction also causes a definite axial movement which is communicated as thrust through the high contact angle thrust bearing to the variable speed output race.

Since the latter is located axially only by this angular contact bearing on the one side and the rollers on the other, the thrust results in an increase in contact pressure between races and rollers. The traction or driving forces between both input races and the rollers act in the same direction, and the reaction tends to rotate the spider which carries the rollers. This tendency toward rotation is imparted to the floating flange by three steel "fingers," Fig. 5. Thus, any change in the imposed torque, whether due to sudden shock load or simply a gradual load increase, results in a change in roller tractive effort, a corresponding partial rotation of the torque flange and a definite change in the roller contact pressure. Symmetrical shape of the inclined grooves in the torque loading flanges insures the same control of contact pressure under rapid reversal.

With a standard 1750 revolutions per minute motor the output speed is infinitely adjustable from 600 to 3600 revolutions per minute, or from 560 to 5600 revolutions per minute, ratios of 6 to 1 and 10 to 1, respectively, depending upon the unit size. No adjustment is said to be necessary and lubrication is added in one place only at lengthy intervals. The power unit is built in 12 different capacities, maximum output ratings at high ratio speeds ranging from 1 to 20 horsepower.

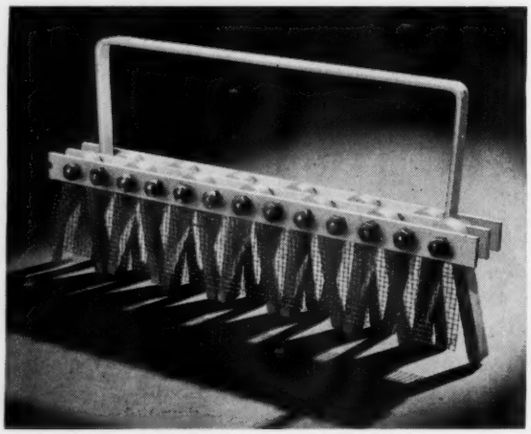
Rake Removes Iron From Enamel Tanks

ONE difficulty which always proves bothersome to porcelain enamelers is the building up of iron particles in ground coat dip tanks as a result of dipping work which has been subjected to shearing, punching or other metal finishing operations. These particles or specks adhere to the work and in subsequent cover coats, particularly white, are often difficult to conceal because the iron oxidizes. To eliminate iron particles, some plants throw away the enamel after 6 to 8 hours standing.

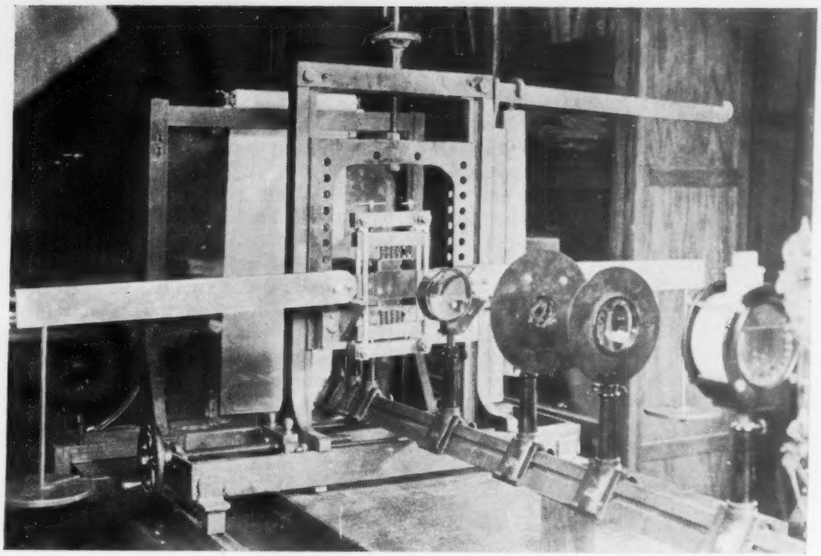
As a solution to this problem, the Ferro Enamel Corp., Cleveland, has devised and placed on the market a magnetic rake which makes it possible to remove the iron particles without the necessity of emptying the dip tanks. Not only does this rake constitute a tool of considerable utility, but it provides a new and interesting use for steel.

As shown in the accompanying illustration, the rake consists of 13 permanent magnets placed in staggered arrangement between three pieces of strap steel and held in place rigidly with bolts. A convenient handle is attached and one side of the rake is provided with a section of steel hardware cloth which becomes magnetized and makes the pick up of particles more effective. The rake weighs 18 pounds and is cadmium plated to provide protection against rust.

Before the rake is used, the enamel should be stirred up thoroughly from the bottom of the tank. The rake then is drawn through the enamel a number of times to pick up the iron particles, care being taken not to scrape with force on the bottom of the tank, which lessens the magnetic efficiency. After use, the rake can be washed off with a high-pressure stream of water and when the magnets are dry, a high velocity air stream will prove effective in removing the iron particles. Use of the rake at least once every hour is recommended. When not in use, it should be hung up in a safe place and care should be taken that it does not drop on any hard surface. The magnets can be remagnetized.



THIS magnetic rake, made entirely from steel and cadmium plated for appearance and rust protection, has been devised to remove iron particles from porcelain enamel ground coat dip tanks



Arrangement of loaded specimen, lenses, polarized light source and screen for observing stresses in bakelite model

Photoelastic Tests Require Care in Preparing Specimens

BY T. V. BUCKWALTER, O. J. HORGER and S. MAULBETCH

VALUE of photoelastic studies as a guide toward economical and safe design is appreciated more widely every year, and the principle is being applied to an increasing number of problems. Various transparent isotropic materials such as glass, celluloid, phenolite, or bakelite can be used for models. Under the action of stresses these materials become double refracting. Consequently if a beam of polarized light is passed through a loaded specimen made of such a material, the stresses may be determined by means of this optical effect.

Shapes which are difficult or impossible to analyze mathematically can be studied in model form under polarized light with excellent results. Complicated types of loading and their effects may be investigated, and the effect of variations in design studied at a lower cost and in a shorter time than by the usual system of physical tests. These results can be checked by routine physical testing as desired.

Problems solved successfully by the photoelastic method are of the two-dimensional type, that is, when the part to be studied is of a uniform thickness and the forces are applied so the stress distribution does not change over the thickness. Such cases are found in numerous practical applications including gears, wheels, beams, welded joints and the like. Even when the stress distribution is not truly two-dimensional it is possible to obtain qualitative results of great value, as for instance in the case of shafts or axles.

Several methods have been developed for the determination of the stresses from the optical effect. One developed by Favre in Europe allows the direct determination of the principal stresses at any point of the specimen, while another method currently used in this country gives the difference of the principal stresses. In order to obtain the stresses separately, the sum of the principal stresses should then be determined. Several methods are available, but in most practical cases it is sufficient to know the maximum shearing stresses in order to determine the danger of failure. In two-dimensional cases, the maximum shearing stress is proportional to the difference of the principal stresses at every point, and this difference is directly obtained from photoelastic study.

It can be shown that the difference of the two principal stresses in a two-dimensional problem such as is presented by the bending of a beam of narrow rectangular cross section, or gear teeth, and in many cases with sufficient approximation, the section through an axle or shaft, can be found by measuring the difference in phase of the two vibrations of polarized light passed through the specimen. To do this the vibrations are brought into interference in the same plane. Using a monochromatic light, a Nicol prism placed behind the specimen will show dark for unstressed areas and bright when stress is present. When white light is used a scale of colors is obtained, each color corresponding to a different stress.

INSIGHT into the effects of design and complicated loading upon concentration of stresses in metal parts is afforded by photoelastic studies of models. The accompanying article describes in detail how these models are formed, annealed and set up for inspection under polarized light. Mr. Buckwalter is vice president of the Timken Roller Bearing Co., Canton, O. Messrs. Horger and Maulbetch are research engineers at the University of Michigan, Ann Arbor, Mich., working on a program of photoelastic tests for the Timken company

Press Fits Being Studied

A comprehensive series of photoelastic studies of various problems connected with the design of press fitted members and their application under different conditions to shafts subject to stress is being conducted by the Timken Roller Bearing Co. in the laboratories of the University of Michigan. This is extended by physical tests in the Timken laboratories, and much valuable information is being developed.

The accompanying illustration shows the optical equipment and setup as used in the Timken research. To obtain accurate focusing of fringes and specimen a thorough study was made to determine the grouping of lenses which would give the best results.

It is important that the height of all lenses be the same, that they be set in position accurately and that the beam in which the specimen is placed be approximately parallel. Prisms are placed at the points of convergence of pencil rays. For photographic work a mercury vapor lamp was used in conjunction with a Wratten 77 yellow filter, giving an almost pure green light which was satisfactory for obtaining sharp black and white fringe photographs. Tests indicated this lamp could be used with the tube either parallel to or perpendicular to the optical axis with apparently equally good results.

The success of photoelastic studies depends to a large degree upon the care and precision with which the specimens are prepared and the rapidity with which the work is done once the specimen is loaded and under observation. Once a specimen is in position there is no time for lengthy adjustment, for aging stresses soon appear which will seriously reduce both the accuracy and qualitative value of the fringe patterns if allowed to progress before the studies are made.

Preparing the Specimens

The chief requirements for specimens to be used in this kind of work are that they be polished on both faces to a degree closely approaching that of plate glass; that the polished faces be flat to the edge of the specimen; that residual and machining stresses be eliminated or reduced to negligible values; that the specimens be used before aging stresses appear around the edges. Most of the work done at the laboratory of the University of Michigan was conducted on bakelite, in polished sheets 6x12x⅜ inches, from which the specimens were prepared.

When the dimensions of the specimen have been decided upon, a rectangular piece is cut from the sheet, allowing from ⅛ to 3/16 inch more than the overall dimensions on all edges. This piece then is annealed. The material is placed on a plate of glass slightly larger than the specimen, with glazed paper between the face of the bakelite and the glass to eliminate the possibility of surface stresses being introduced during the annealing process. The assembly then is centered in an electric furnace which is held under precise temperature control by means of thermocouples.

Annealing is a delicate operation and must be watched closely, particularly with regard to cooling. In the literature, temperatures of from 80 to 95 degrees Cent. are recommended for bakelite. In the Timken program, 85 degrees was used for all bakelite specimens. The furnace should be sealed carefully against drafts and as soon as the thermocouple shows the desired temperature has been established the automatic cooling mechanism should be started. It required from 17 to 20 hours to bring the temperature down to within 10 degrees of room temperature in the work under discussion, after which the automatic regulation was disconnected and the furnace allowed to finish cooling normally.

After the specimen has been annealed it may be machined to within 0.003-inch of size, using a fine feed and light cut to avoid introducing serious stresses. In any case, annealing will be necessary after machining. However, if the specimen is of such a shape that it can be filed or lapped to size, this annealing may be omitted, as any stresses due to filing at right angles to the plane of the specimen will not appear under polarized light. If the specimen is annealed, it should be examined again under polarized light. A fine bright line around the edges may appear. This is believed to be caused by a surface evaporation effect which occurs during the annealing period. This may be removed by a light remachining. In any event the specimen should be finished to size, using a light feed with great care.

In making the various photoelastic studies in this program, a standard time of 5 minutes after application of load was established for taking photographs, so that optical creep would be the same percentage of the initial optical effect at all times.

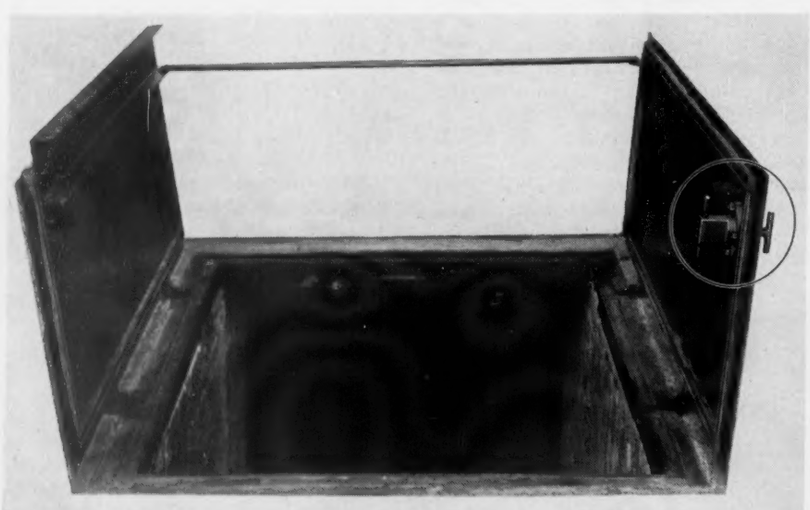
Standardizing the Results

To provide a base for calculations and establish a standard to which indeterminate stresses in various shapes could be compared, an initial study was made in the Timken program on a rectangular bakelite beam section loaded in pure bending. The specimen was prepared as outlined above, and in order to obviate any residual edge stresses two marks were made on the specimen and the number of fringes counted between them. Both of these marks were on the same side of the beam center line.

The effect of residual stresses in the body of the beam was eliminated by measuring the number of fringes due to a change in load. These studies showed that for a model ¼-inch thick the fringe constant was 335.5 pounds per square inch in the test beam. Fringes originate at the edge of the beam as the load is applied and travel toward the neutral axis as the load is increased, fibre stresses increasing in direct proportion to the distance from the neutral axis.

Although considerable quantitative data can be obtained from photoelastic research, the principal value lies in the graphic qualitative analysis of stress location and concentration. Upon information of this nature modifications in design can be based, and an understanding reached of the causes of good or bad performance under service conditions. Data which will prove to be of vital importance to the railroad industry as well as to all builders of machine tools, automobiles, steel mills and the like have already been developed.

Boon to Pedestrians

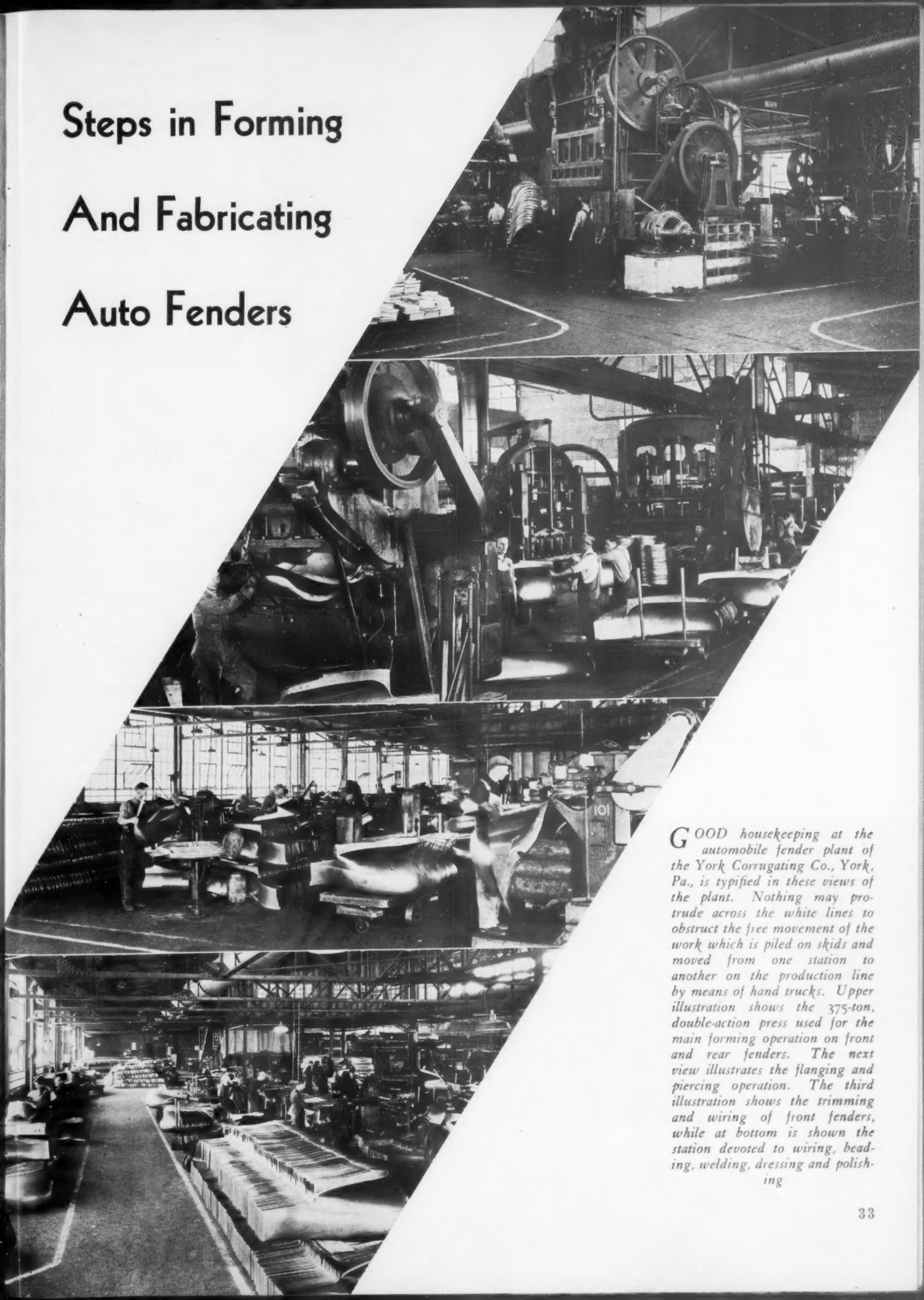


NON-PROJECTING LOCK FOR HORIZONTAL DOORS AND CLOSING DEVICES is particularly applicable to steel closures, including doors made of rolled floor plate. Invented by J. William Lovatt, structural engineer, James Radcliffe & Sons Co. Iron and Steel Works, Paterson, N. J., this device is known as the Lev-L-Lok. Pedestrians cannot trip over this lock. It automatically seals its key hole against dirt and the elements. When inserted in the lock, the key becomes the handle of the door. Key combinations may be many and varied, depending on the number and thickness of Ward plates used in the lock. It may be fitted electrically to operate a burglar alarm. It is intended for sidewalk doors, coal hole covers, vaults, stop-cock boxes, roadway covers and frames, meter boxes, inlet pipes for fuel oil and gasoline and many similar purposes

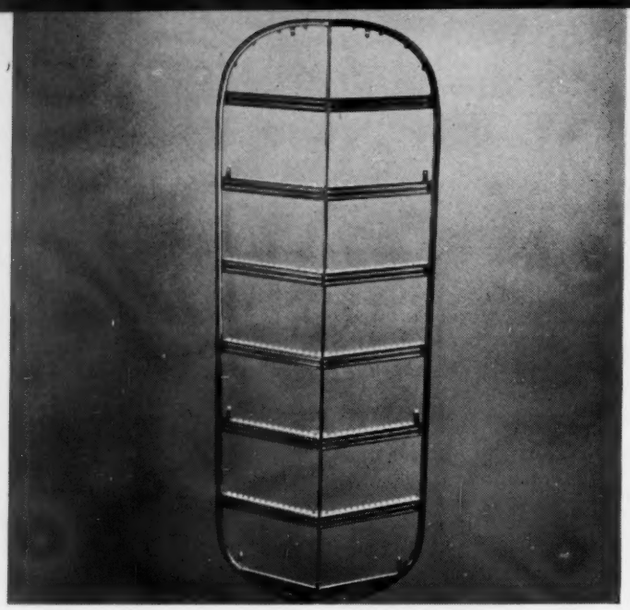
Treating Coke for Cupolas

One thing that might be worth investigating to obtain improved cupola operation is the claim that sodium carbonate increases the reactivity of coke. Quenching the coke in a strong solution of carbonate should insure thorough impregnation.

Steps in Forming And Fabricating Auto Fenders



GOOD housekeeping at the automobile fender plant of the York Corrugating Co., York, Pa., is typified in these views of the plant. Nothing may protrude across the white lines to obstruct the free movement of the work which is piled on skids and moved from one station to another on the production line by means of hand trucks. Upper illustration shows the 375-ton, double-action press used for the main forming operation on front and rear fenders. The next view illustrates the flanging and piercing operation. The third illustration shows the trimming and wiring of front fenders, while at bottom is shown the station devoted to wiring, beading, welding, dressing and polishing



Zinc die casting for La-Salle radiator grille, finished in chrome plate

IMPROVED FINISHES FOR DIE CASTINGS

BY JOSEPH FOX
Chief Metallurgist, Doehler Die-Casting Co., New York

MANY current applications of die castings can be attributed to the great variety of finishes possible. Practically every type of commercial finish can be applied to die castings, at low cost. The smooth, dense outer structure makes for economy in the preparation of the surface for finishing, and contributes to the life and service of the finish applied.

Increasing uses of die castings, particularly those requiring finishes for decoration and protection, have created a demand for better methods, technique, inspection and testing all of which have led to increased life of the finish, and to lowered costs.

Many large users of die castings are now issuing definite specifications covering the type, method, and the amounts of each metal to be deposited in electroplating. Similarly there are now specifications for enameling, lacquering, japanning and other types of finishing.

The result of the rigid enforcement of these specifications is making the application of scientific control in finishing more and more necessary. The immediate effect is bringing about better understanding between producer and consumer, and obviously a better product.

Fruit press of alumium die castings, ball burnished. All parts have received the same finishing treatment

Die Casting Alloys

The alloys used in present die casting practice are those of the following groups: (1) Tin and lead base; (2) zinc base; (3) aluminum base; (4) magnesium; and (5) copper base alloys. The zinc and aluminum base alloys which will be discussed here are the most important commercially and make up the major portion of production and consumption. Tin and lead base alloys are being used in relatively small amounts and their applications seldom require finishing either for decoration or protection. Magnesium base and copper base alloys are of comparatively recent development.

Zinc Base Alloys

The standard type of zinc base alloy is composed essentially of copper, varying from 0 to 3 per cent, aluminum 4 per cent, magnesium 0.05 per cent and the remainder made up of the highest grade zinc commercially obtainable, that of the 99.99 per cent grade.

The development of this high grade zinc, carrying as it does minimum amount of impurities, has without doubt been a potent factor in promoting the use of zinc base die castings. High strength, stability, freedom from intercrystalline corrosion, and low cost of finished die castings of this type f alloy, find wide favor in industry.

Zinc base alloy die castings are finished in many ways for decoration and protection against tarnishing and surface corrosion. In the automotive industry electroplated zinc die castings are being used for interior and

Present-day emphasis upon product appearance has spurred manufacturers of die castings to greater achievements in finishes. Application of scientific control to finishing methods lends valuable assistance.

Aluminum cooking utensils, wire burnished. Exterior and interior are whitened

exterior hardware, radiator and body trim, radiator caps and ornaments, lamp housings, and brackets which are for the most part being finished in nickel and chromium.

In the electrical, radio, household utilities, plumbing and other industries, zinc die castings are either electroplated, enameled or finished with a combination of plating and enamel. Electric fan bases, clock cases, automobile heaters, jewelry boxes, pen stands and re-use packaging containers, are being finished with combinations of variously colored enamels and highly polished chromium plate.

Many applications of zinc die castings, such as automotive carburetors and fuel pumps, washing machine parts and other mechanical devices are used in the natural "as cast" condition without any treatment. Such parts may be used for long periods of time without any effect on their general utility. It is only when appearance is important for sales demands that the castings are plated or otherwise finished.

The corrosion of zinc die castings in moist atmospheres is moderate; only the surface is affected which does not in any way impair the physical properties, any more than surface corrosion affects most other metals.

Electroplating Methods

Chromium plate, because of its tarnish resistance, hardness, and color, is the most popular electroplated finish applied to zinc die castings. Chromium can be deposited direct to the base metal, but the deposits are thin, porous, and do not have much corrosion resistance for outdoor exposure. Therefore, in electroplating zinc die castings it is the common practice to deposit another metal directly on the base metal. This in turn is followed by a finishing plate of chromium to gain the maximum in protection. Nickel, and nickel and copper have been found most suitable for application under chromium.

Extensive laboratory and service tests show a definite minimum thickness of deposit of this underlying metal which is necessary for each condition of use. For instance, on articles such as ornaments, and fittings used in the interior where not subject to excessive moisture, a minimum thickness of 0.0002-inch (equivalent to 4.0 grams nickel per square foot) is satisfactory. For parts used outdoors subject to varying atmospheric conditions and where the cost of finishing must be kept low, a minimum thickness of 0.0003-inch nickel (equivalent to 6 grams nickel per square foot) should be used. This type of plate gives adequate protection under normal service conditions.

For severe conditions of use, and where the maximum in quality of finish is desired, a third type of plate is regularly used. This involves application of a copper plate direct to the zinc base having a minimum thickness of 0.0004-inch, followed by a nickel deposit between 0.0005 and 0.0006-inch. Then the usual chromium deposit is applied which in each type of plate is usually 0.000025-inch in thickness. In this last type of plate it is to be noted that the total thickness of copper and nickel plate is 0.001-inch. This heavy plate has been found highly satisfactory even under unusually severe conditions of exposure. It has sufficient mechanical strength and is sufficiently free from porosity to afford adequate protection to the base metal.

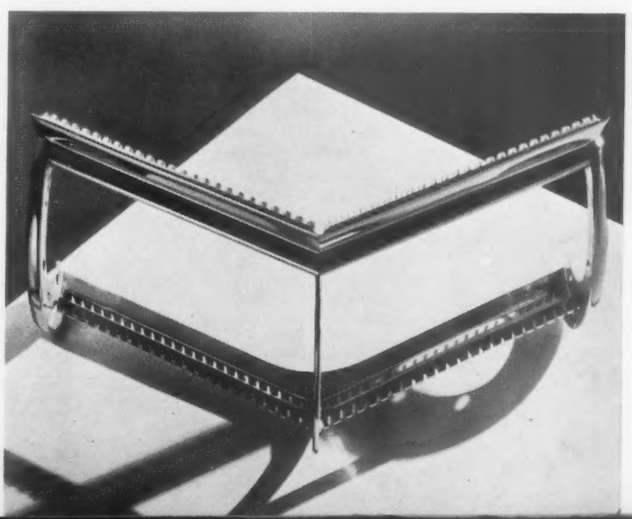
Good adherence and quality of plate cannot be obtained unless all factors governing the proper practice in electroplating are co-ordinated and controlled. It is highly important to have a definite knowledge of salient factors which affect the character of the deposited metal:

1—The casting must be sound of surface, free from run-marks, porosity and other surface defects.

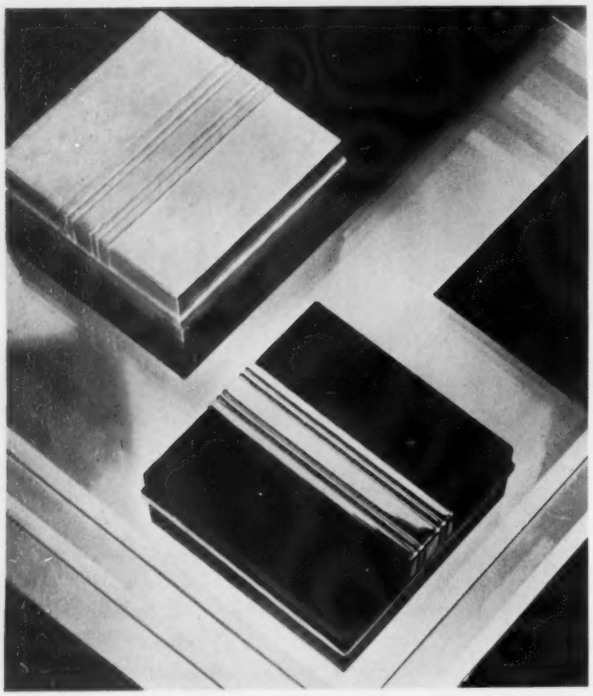
2—The castings must be polished and buffed properly.

3—The casting must be cleaned thoroughly.

4—The plating baths must be of the correct composition and main-



Zinc die casting for Cadillac radiator grille, with chromium plated finish



Unfinished and finished appearance of novelty boxes of zinc die castings. Chromium plating is combined with a black enamel to give pleasing contrast

tained properly by constant analysis.

5—The current density, concentration of hydrogen iron, and temperatures, must be watched carefully and kept into line.

Zinc die castings are also finished with other electroplated metals. Brass, bronze, gold, silver and others less common may be applied readily over a good primary coating of nickel. If this procedure is followed, lasting finishes will be obtained.

Of current interest is the series of outdoor exposure tests to be conducted on zinc die cast specimens by the joint committee of the national bureau of standards, American Electroplaters' society and the American Society for Testing Materials. Different types of plating will be tested at several outdoor locations. The ultimate objective is to establish definite specifications covering methods and minimum thickness of deposits for each specific use.

Nonmetallic Finishes

The user of zinc base die castings has at his command a wide variety of organic finishes and combinations of finishes which can be applied to enhance the appearance and increase the sale of his product. Brilliant colors or dark tones of enamels and lacquers, lustrous japan or combinations of enamel with electroplated metal may be used effectively. Another attractive arrangement which has beauty and sales appeal is brought about by using a combination of chromium plated zinc die casting together with variously colored plastics.

Preparation of the metal surface for application of enamels, lacquers and similar coatings, is a most important item in the ultimate life of the coating. Improved knowledge of the technique of pretreatment of metals for finishing has led to greatly increased uses of lacquers and enamels.

Three important factors must be observed in the preparation of the surface:

(1) The metal first must be thoroughly cleaned. Oil, grease, alkali films and miscellaneous matter must be removed if an unbroken adherent coating is to be obtained. Alkaline solutions or organic solvents may be used, depending upon the surface condition.

(2) The metal surface preferably should be roughened or etched to provide anchorage for the initial coating material. Sand blasting the surface with a fine sand is effective in this treatment. On some metals a deep acid etch can be used to roughen the surface.

(3) The use of a suitable priming coat directly on the base metal is advisable for inhibiting corrosion, insulating the metal surface, resisting penetration by moisture and acting as a base for succeeding finish coats. A good primer properly applied and baked is more important in giving successful protection to the metal than the quality of finishing coats. Once a metal is properly primed, any type of paint or enamel can be used in finishing. Chromate primers and iron oxide primers suspended in a good synthetic resin vehicle will show excellent corrosion inhibiting qualities, and are used extensively. Aluminum paint in a synthetic resin vehicle makes a good primer as well as finishing coat on many applications of zinc and aluminum die castings.

The newer synthetic resin types of enamels made with glyptal and bakelite resins have excellent properties and are being applied to zinc die castings extensively. These materials have all the properties of pyroxylin lacquers and in addition have unusual adhering qualities. They are capable of high gloss and resist the action of chemicals, oils and gasoline to a marked degree. They are usually sprayed on zinc die castings which have been previously coated with a suitable primer, then baked at relatively low temperatures for short intervals of time; the heat being necessary to change the resin chemically and make it resistant to heat and insoluble in various media. The heat of baking also aids in binding the material to the metal or primer used underneath.

Enamels containing synthetic resins have other advantages, including flexibility, resistance to abrasion, impact and perspiration.

Miscellaneous Finishes

For lower cost finishes on zinc die castings, there are a number of chemical solutions which color the metal by immersion. In some solutions a black deposit is formed by simple replacement. Most of these deposits, however, are of film thickness, are relatively nonadherent and must be fixed either by a wax or a clear lacquer treatment. Typical of such solutions are those containing arsenic or antimony oxides in alkaline solutions which give a gun-metal to black finish, depending upon the temperature and the length of time left in the solution.

Other solutions which give varied effects contain nickel, copper, molybdenum or silver salts.

Aluminum Base Castings

For all practical purposes the aluminum base alloys for die casting may be classified under three main groups as follows:

(1) Aluminum-copper alloys.
(2) Aluminum-copper-silicon alloys.
(3) Aluminum-silicon alloys.

The desirable properties found in aluminum base die castings are: (1) Light weight; (2) corosion resistance; (3) ability to take and hold a lustrous polish, and (4) thermal conductivity. Most of the applications of aluminum base die castings are attributable to one or several of these properties. For household appliances aluminum die castings are indispensable because of light weight, thermal conductivity and corrosion resistance. Cooking utensils and ice trays are of aluminum because of its thermal conductivity and corrosion resistance. Aluminum die castings are used for vacuum sweeper parts and floor waxers because of lightness and the lustrous polished finish.

Increasingly large quantities of aluminum die castings are being

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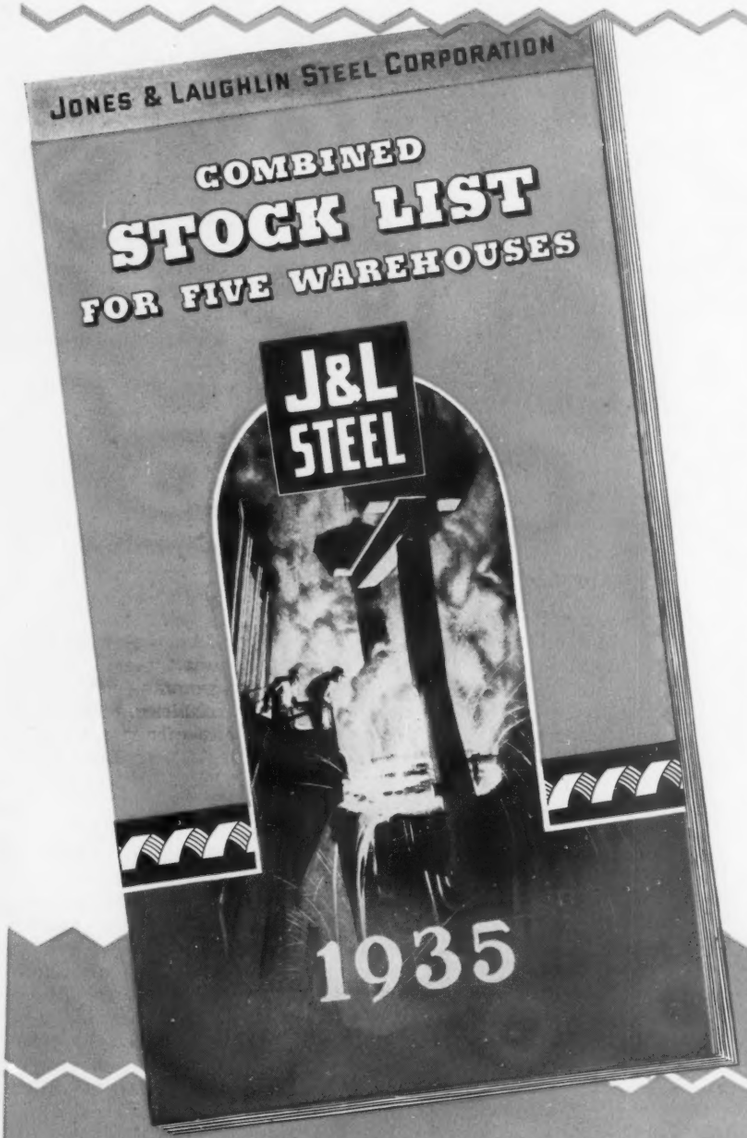

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From left to right, top to bottom: Rejector hinge, zinc die casting chromium plated; clock bezel, zinc die casting gold plated; clock base, zinc die casting polished and lacquered; automotive hardware, aluminum die casting with colored anodic finish; radio escutcheons, zinc die castings with bronze finish; and a special aluminum die casting, ball burnished

specified for the anodic oxidation and coloring treatment. Highly decorative possibilities due to the infinite variety of colors obtained by this process are being fully realized, ample protection is afforded by this process for applications under severe corrosive conditions.

Retain High Luster

Aluminum base castings may be polished to a high luster which will be retained indefinitely under ordinary atmospheric conditions. The retention of luster is due to the spontaneous formation of a thin film of aluminum oxide which protects the underlying metallic surface. Many applications of aluminum die castings are currently being finished in this manner.

In addition to polishing, aluminum die castings may be given other similar attractive finishes, such as a satin or frosted finish produced by scratch brushing, or by using pumice polishing compounds. A white frosted finish can also be brought about by dipping the article in a strong alkaline solution, followed by a dip in a strong mixture of hydrofluoric and nitric acids. Still another method for brightening aluminum die castings, which is employed to some extent, is by a ball burnishing operation, wherein castings are tumbled in a suitable soap solution with steel balls and other abrasive materials.

Technique for Electroplating

Although electroplating of aluminum die castings is seldom employed as a means for finishing, it is practical to do so. Special technique and care, however, must be exercised to produce good adherent deposits. The chief difficulty in the electroplating of aluminum base materials, no matter how they are fabricated, is in obtaining good deposits which will not ultimately flake or peel in service. A means for overcoming this trouble is in the introduction into the plating procedure of a strong acid etch prior to the plating operation.

Chromium and zinc metals can be deposited directly on aluminum, but these coatings are only fairly resistont to corrosive conditions. For the majority of uses, nickel is used as the primary coating metal. Once a good nickel coating is deposited, chromium, copper, brass, gold, silver and other metals may be deposited with facility.

Surface Preparation

As with zinc base alloy die castings, the surfaces of aluminum die castings must be prepared properly for finishing with lacquers, enamels, japans, varnishes and the like. Sand blasting the cleaned casting, followed by a coating of a suitable inhibitive primer, which is baked, will insure sufficient foundation for subsequent finishing coats. A good primer for aluminum die castings which can also be used for a finishing coat as well, is aluminum paint made with a good synthetic resin vehicle. This type of finish is being applied to many aluminum castings where it is desired to maintain a uniform color under extreme atmospheric conditions.

Phenolic resin, enamels and varnishes on aluminum die castings offer resistance to heat and moisture, while acting as a protection against chemicals, solvents and dilute acids and alkalies.

Japan, an oil enamel made up of the mineral gilsonite dissolved with suitable solvents and drying oils, is used extensively for many aluminum die castings. The general process is to remove the solvents by heat and fuse until a uniform vitreous layer is formed, thus producing a tough durable finish. Two or three coats usually are applied, the surface being carefully rubbed and polished between coats. The cost of material and production of this type of finish is relatively low, and when properly applied is durable. Sewing machine parts, adding machine and typewriter parts and similar aluminum die casting parts are finished in japan.

Anodic Oxidation and Coloring

One of the best means for treating aluminum die castings both for protection as well as for decoration is by the anodic oxidation process. If it were not for the ever present protective film of aluminum oxide, aluminum and its alloys would be affected seriously by moist atmospheres and other corrosive media. The film is normally so thin as to be invisible but it is sufficient to protect the metal against atmospheric corrosion. By special means, heavy oxide coatings can be produced artificially on surfaces of aluminum. Perhaps the best means of accomplishing this is the anodic oxidation process. The thickness of the oxide coating can be varied up to a point, and such anodic coatings have been found to have better properties than oxide coatings which are produced by various other methods.

In the anodic process, the aluminum article is made the anode, or is connected to the positive terminal of an electric circuit and immersed in a suitable solution, with a definite voltage applied. An extremely tenacious oxide coating is produced which is resistant to moisture, salt water and other corrosives. The oxide coating is formed of the metal itself and will not chip or flake. Further, the oxide coating is absorptive, being capable of taking on certain types of aniline dyes, mineral pigments, permitting endless color possibilities. The coating is also capable of absorbing oils and waxes which further enhance its protective properties.

Restriction on Alloy Type

Anodic oxidized films on aluminum die castings are highly desirable both from an ornamental as well as protective view point. Protection against staining, corrosion and wear can be given any of the standard aluminum die casting alloys. There are, however, some restrictions as to the alloy most suitable for casting and service. Special alloys have been developed for this process. Doehler "E" alloy, containing about 94 per cent aluminum, gives a good combination of light, color, hardness, wear, abrasion and corrosion resistance. Typical examples of this type of finish are found in aluminum die cast food mixer parts, washing machine parts, moving picture parts, toothbrush handles, automotive hardware and novelty items.

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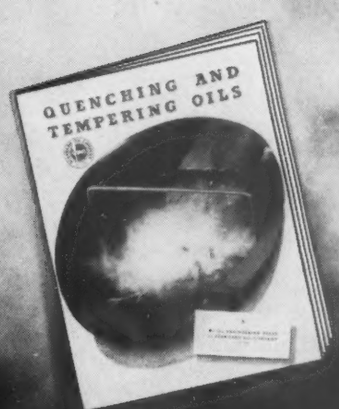

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METHODS AND MATERIALS

Rubber Coating Is Applied Like Paint

TO PROVIDE protection against corrosion, deterioration and damage in handling, storing or shipping manufactured articles, Kelsan Products, St. Clair, Mich., has developed a low-cost rubber coating, which can be applied to any material by brushing, spraying or dipping. Developed as a result of several years' research and trade-named Kelsanite, the material is a noninflammable liquid containing latex which turns into live rubber in a few minutes after application.

While the coating has high adhesive qualities, it does not vulcanize onto the surface to which it is applied; as a result, it is said to be as readily removable as a cellophane wrapper when it has performed its function. It is available in several viscosities and compositions to best suit specific needs, and, according to the manufacturer, contains no material which can injure the most finely finished surface. Since rubber is insoluble and is as waterproof and air tight as any material known, it should provide complete protection.

It is reported that one automobile manufacturer has been experimenting with the possibility of coating a complete automobile body as it comes out of the paint shop, leaving the coating on while the body goes over the final assembly line. Consideration has been given to leaving the coating on during road test, shipment or drive away, removing it only just before delivery of the car to the purchaser. Removal of the coating is simple, involving merely the loosening of an edge and then pulling the whole coating off in one sheet.

Another application of promise is that of coating piston pins for distribution to the automotive service trade. To demonstrate its effectiveness as a rust preventor in storage of metal parts, coated parts have been subjected to over 150 hours in salt spray without showing signs of corrosion. The coating also is said to act as a cleaning compound, absorbing dirt and moisture on the surface being coated. When removed it leaves the surface dry and clean. In the plating of metal parts, the coating is said to have a definite field as a masking compound to prevent deposition of metal except where desired. Following the plating operation, the coating is then readily stripped off.

Weighs and Counts

STRAIGHT-WEIGHING AND COUNTING SCALE: Installed at the plant of Barnes-Gibson-Raymond Inc., Detroit, this scale is used to weigh and count extremely small springs and other formed wire products. It is graduated to 0.00001-pound and can be read to 0.000005-pound or 1/28-grain. The young lady is holding a box containing 8500 coil springs, weighing 0.016-pound per thousand, typical of the material weighed and counted on the scale. Counting is based on the weight per thousand pieces. In actual operation, this scale, built by Toledo Scale Co., Toledo, O., is housed in a cabinet which prevents air currents from reaching it

\$ \$ \$

Removal of Broken Stud Facilitated by Welding

An ingenious method recently was employed by a Southern California metalworking plant for removing a broken stud from a cylinder block. The stud had broken off slightly below the surface of the block and an "Easy-out" had been tried and broken off, making it impossible to drill out the stud.

A washer having a hole about the size of the stud was placed on the block over the stud and an arc welder used to build up the stud and weld it to the washer. A nut was tack-welded

to the washer, again using the arc, after which cold water was poured over the nut. This cooled the nut and exerted a tendency toward shrinkage of the broken stud. It then was a simple matter to remove the stud with a wrench.

$ $ $

Markets Acid-Resisting Frit for Enameled Signs

A new clear acid-resisting frit known as No. 924 and particularly adapted to the outdoor sign industry has been placed on the market by O. Hommel Co., Pittsburgh. The product, however, may be used with equally satisfactory results on any porcelain enameled products, such as stoves and refrigerators, where acid-resisting qualities are desired.

No. 924 may be applied over colored porcelain enameled signs, and because it is clear as transparent glass it allows the colors to reach the eye in all their shiny brilliance. Because of its strong acid-resisting qualities it protects these colors from the ravages of the weather, particularly in industrial localities.

$ $ $

New Oil Burner for Water Heater Cuts Fuel Bill

Champion Products Co., Worcester, Mass., has developed an improved domestic water heater designed for economical operation and attractive appearance. The new heater, as a result of laboratory tests, is said to afford a saving of approximately 40 per cent in fuel consumption as compared with ordinary heating methods. The heater is equipped with a new type of burner with automatic heat control for high and low flame by means of a thermostatic system governed by the degree of water heat. That is, the hot water controls the flame at all times. The burner is equipped with an oil filter and dehydrolator so that no dirt or water can find its way into the fuel line.

$ $ $

Simple Lubricating Device Lengthens Life of Punch

An ingenious device has been worked out by a gas range manufacturer for lengthening the life of the punch used in placing bolt holes in sheet steel parts. These holes are punched in a horseshoe gage punch press having unusually wide gap. From a tank attached by a bracket to one side of the punch press, lubricating oil flows through a rubber hose which connects with an opening in the punchholder. The length of the hose has been so regulated that at each down stroke the lower end of the hose is moved downward sufficiently to permit a drop of oil to flow into the punchholder and down the punch to the work. Formerly it was necessary to grind the punch after 250 holes, on the average, had been punched. It now is possible to punch approximately 1550 holes before regrinding becomes necessary.

$ $ $

Chromium in Malleable Iron

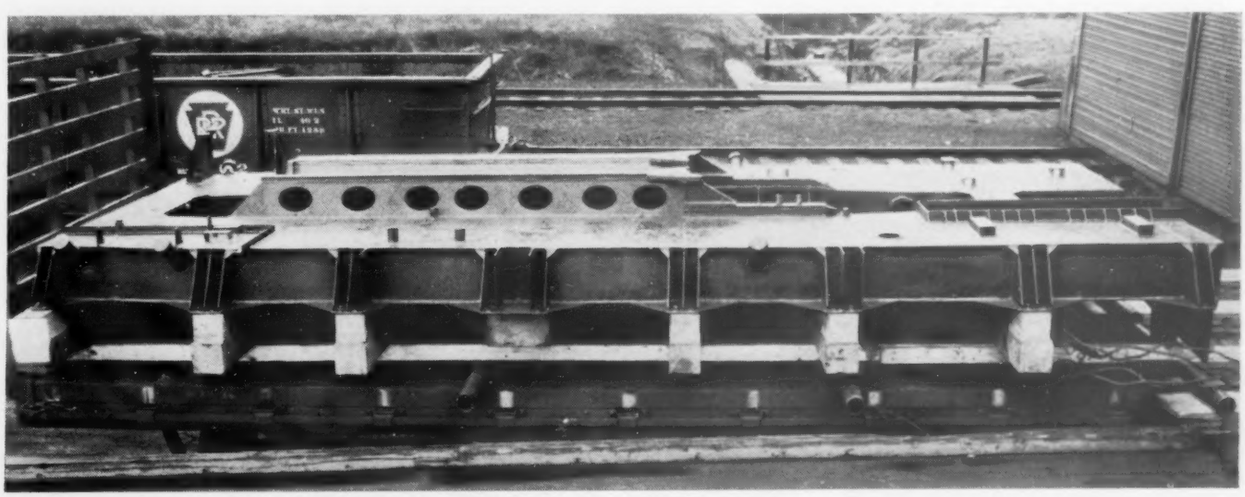
While the use of chromium in malleable cast iron causes trouble in graphitization, a recent patent states that such trouble can be eliminated by increasing the silicon content, preferably in the ratio from 0.2 to 0.7 to the chromium content. It cites addition of 0.15 to 2.00 per cent chromium and from 0.3 to 2.0 per cent silicon.

Use Welded Steel Construction for High-Speed Train Engine Foundations

THE COMET, the new high-speed, light-weight, 3-car train of the New York, New Haven & Hartford railroad, built in the plant of the Goodyear-Zeppelin Corp., Akron, O., and delivered to the railroad on April 29 (see STEEL, May 6, page 38), is driven by two 400-horsepower diesel engines, one installed in each end of the train. For the supports of these engines in the aluminum alloy car body structure, welded steel bedplates are used, which replace part of the car understructure over the trucks.

The bedplates, approximately 19 feet long and extending over the full width of the car, not only form the lower portion of the engine crankcase and generator support but also the bolster with its side and center bearing, and all brackets required for mounting auxiliary engines and the tie-in with the rest of the structure. The bedplate is formed by two plates, one on the top and one on the bottom, and longitudinal and transverse bulkheads, which create a series of small compartments. These compartments will be used for the storage of fuel, lubricating oil and water.

On account of the weight limita-



Here is shown one of the two welded steel bedplates for the new high-speed light-weight 3-car train for the New Haven railroad. Longitudinal and transverse bulkheads between the top and bottom plates form compartments for storing fuel, lubricating oil and water

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tion paramount for application in a high-speed light-weight train, the steel plate had to be limited to thicknesses of only ¼-inch and ⅜-inch. These bedplates, which not only had to be accurate in dimensions, since part of the body structure was already built, but also had to be tight, were manufactured by the Babcock & Wilcox Co., Barberton, O.

Plates of Cromansil steel containing 0.20 per cent carbon, 0.50 per cent chromium, 1.10 per cent manganese and 0.65 per cent silicon, were used as material throughout. The longitudinal and transverse bulkheads are attached with two-sided welds to the bottom of the bedplate formed by a single plate.

Since it was impossible to use the same method of welding for the top plate, it was made in small pieces covering the individual compartments and welded alongside the upper edge of the bulkheads. To further increase the strength of this weld, a ¼-inch rod was tack welded to both sides of the bulkhead edges. This rod, on which the individual top pieces were resting, formed a backing for the weld.

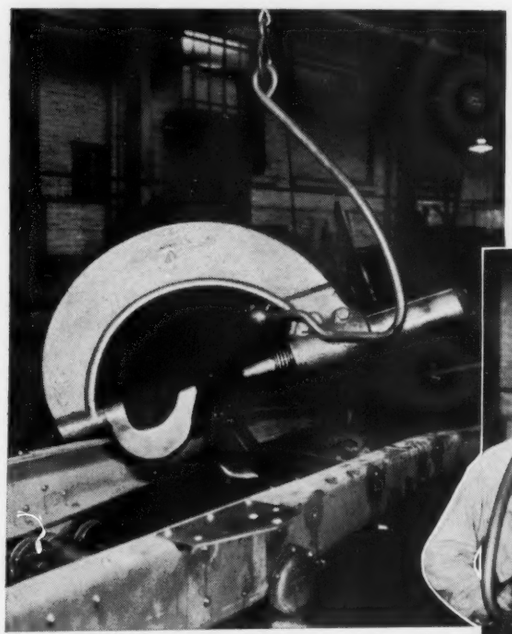
Pipes Welded in Place

Pipes, serving as conduits for the wiring to the electric traction motors, others for the sanders, the filling and drain connections and also for the steam cleaning of the oil compartments, were welded directly to the structure before the top plates were applied. An empty space with drain holes has been provided between all compartments containing a different type of liquid. After the top plate was applied, the engine and generator supports and also the body bolster were welded in place.

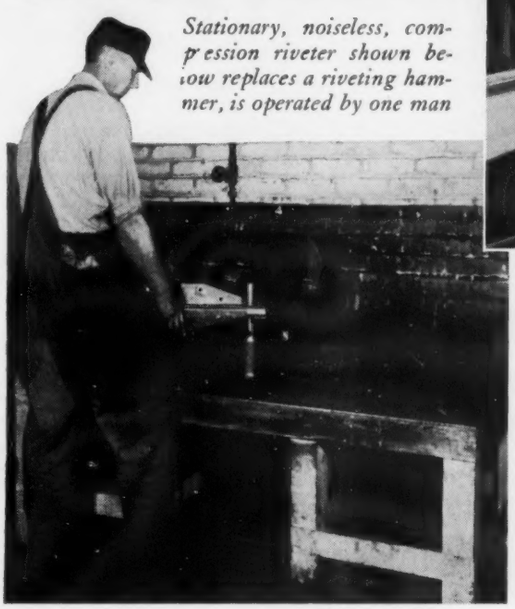
Because of the high degree of accuracy required for the bedplate, it was not only necessary that all welding operations be done in a sturdy jig, but also that some forming operations be performed during the various stress relieving heat treatments. After the bedplate was completed, it was machined to a very close machine finish not only to provide tightness of the crankcase and motor-generator alignment, but also to provide the correct dimensions between center and side bearings and the rest of the structure.

To assure tightness, the various

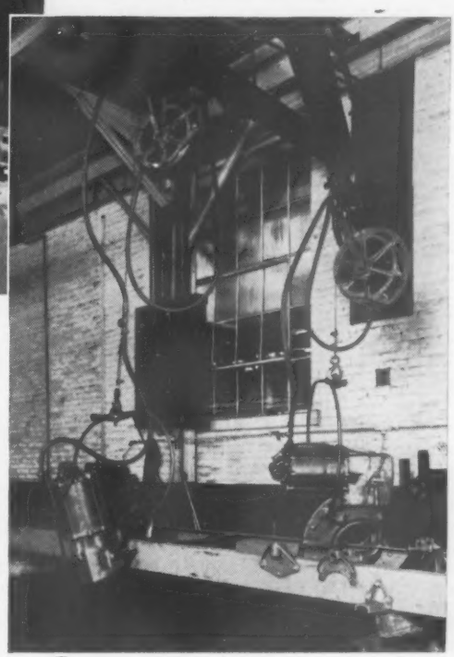
Ingenious Methods Used in Riveting Auto Truck Frames



Safety balancers, hitherto used largely for manipulating riveting tools weighing up to 150 pounds, now are used with units weighing up to 300 pounds. The balancers shown below permit featherweight handling of portable compression riveters within a vertical range of 3½ feet, sufficient to reach all riveting locations in the job and allow elevation of the riveters so that the frame may be moved along the production line



Stationary, noiseless, compression riveter shown below replaces a riveting hammer, is operated by one man



Yoke riveters, such as that shown above, frequently must be equipped with specially designed dollies to fit difficult locations. At the upper left is shown a view of the dolly designed for this job

compartments were tested under a pressure of 10 pounds per square inch with liquid soap being applied to all points where a possible leakage might occur.

Generally speaking, it can be said that a welded steel box-type structure is well suitable as an engine foundation for high-speed trains, since it combines the required stiffness with extreme rigidity required for engine alignment and provides the necessary tanks for fuel, water and lubricating oil, thereby eliminating the mounting and piping of special tanks.

Discuss Selection of Materials and Best Methods of Treatment

NUMEROUS problems in heat treatment and related operations in the fabrication of steel and other metals received attention at four roundtable discussions at the fourth sectional meeting of the Middle Atlantic group, American Society for Metals, held at the Pennsylvania hotel, New York, May 24. The co-operating chapters included those of New York, New Jersey, Philadelphia and Lehigh Valley.

The role of metals in the transportation industry was the subject of discussion at a special session presided over by H. J. French, International Nickel Co., New York. In this symposium, Col. E. J. Ragsdale, Edward G. Budd Mfg. Co., Philadelphia, spoke on the railroad industry; J. B. Johnson, chief. materials division, United States army air corps, Wright Field, Dayton, O., on the aeronautical industry, and J. M. Watson, Hupp Motor Car Corp., Detroit, on the automotive industry.

In a group meeting on "Heat Treatment in Protective Atmospheres," presided over by Sam Tour, Lucius Pitkin Inc., New York, it was revealed too little is known about gas analyses. One particular gas analysis, at a certain temperature, is good on only one steel, it was stated. A complete study which would result in data showing the correct gas analyses and temperatures for each steel would prove most useful in enabling steel treaters to get uniform results. The presence of water vapor was discussed; some speakers thought this constituent should be removed. The majority, however, felt rather that the quantity of water vapor in a furnace atmosphere should be controlled.

Stainless steel heat treated in a carbon monoxide atmosphere does not develop full hardness, it was stated. In a neutral atmosphere it becomes mottled and develops pitting. Best results are obtained when the atmosphere contains about 14 per cent oxygen, which brings about a satisfactory surface condition. When stainless steel is coated with high sulphur cutting oil, the oil, in heat treatment, will ruin the surface unless first removed.

The problem of discoloration of cold-rolled mild steel strip, produced in continuous mills, was brought up. Such discoloration is of three types, including tempering stains at the edges, a grayish dirt left after the oil has evaporated and a deposit of bright carbon. While the problem has a relation to the oil used in cold rolling, the causes of this discoloration are unknown. It occurs intermittently, with apparently identical conditions prevailing during the production of both bright and discolored strip. It was revealed that the problem now is being studied actively.

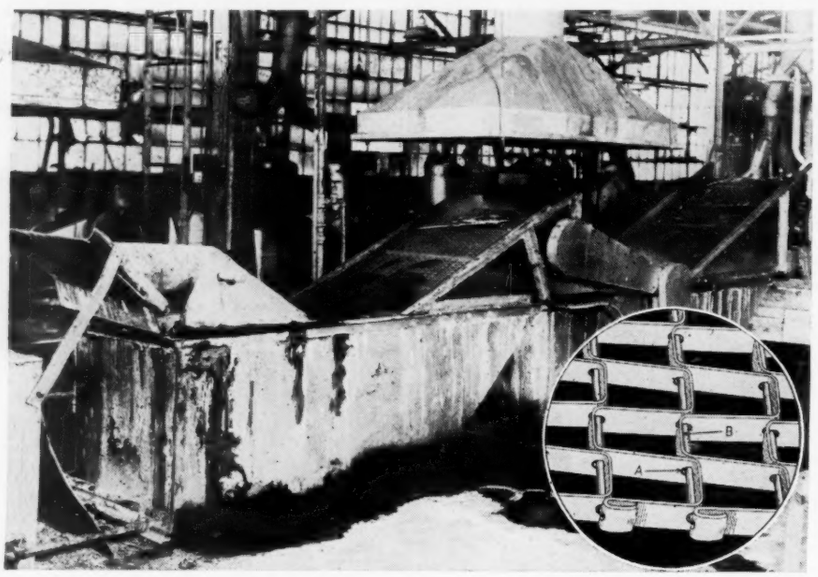
Combining Operations

Can you slightly carburize and heat treat high-speed steel in the same operation? This question received an affirmative answer, it being stated that the old-fashioned method of packing in a spent carburizer and heating up to 2100 degrees Fahr., followed by a strain relief treatment at light straw color, was the best method of getting this result.

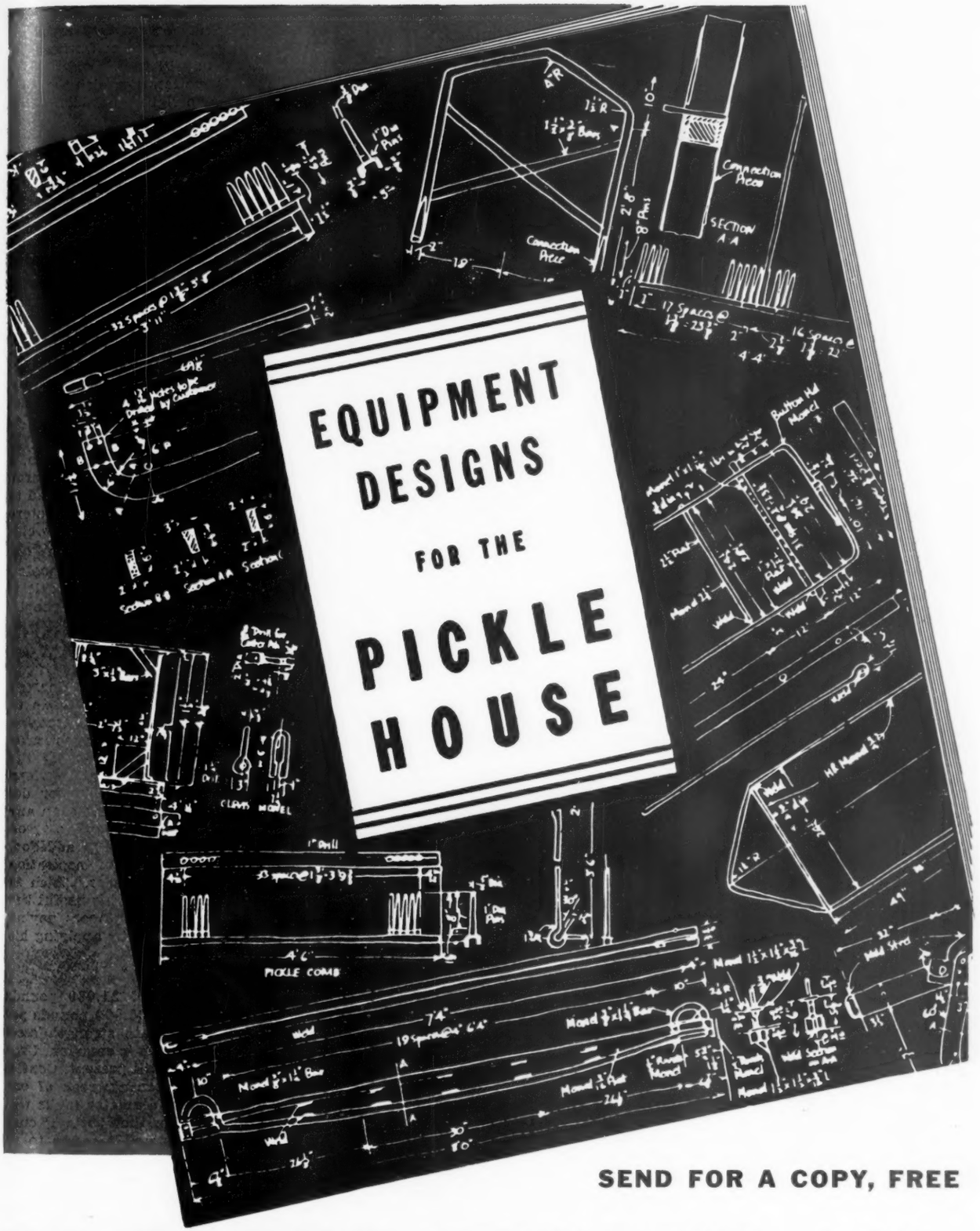
In discussing the preparation of tools prior to heat treatment, one speaker said that cutting tools with finely ground edge will last longer than those with coarsely ground edges, as fine grinding leaves ridges which are small in size, so that chips clear off the tool more readily. It was said that the retention of accuracy in dimensions of heat treated parts is a matter involving intelligent use of existing equipment rather than one requiring the use of special equipment.

In a session on stainless steels, presided over by L. S. Bergen, Crucible Steel Co. of America, Harrison, N. J., it was the consensus of opinion that no one stainless steel is a cure-all for all corrosion problems but that the industry is prepared to vary its analyses to meet specific requirements. It was estimated that 90 per cent of stainless steel failures result from attacks by chlorine or other halogen gases, resulting in pitting. Resistance to pitting may be increased, it was stated, by a change in heat treatment and

Mesh Belts Strengthened



STEEL-MESH CONVEYOR BELTS IMPROVED: Open-mesh steel conveyor belts, long manufactured by the Acme Steel Co., Chicago, recently have been improved in construction. The belts are made up of formed spindles of flat steel connected by pivot rods. Formerly these rods were strung through round holes, and the edge of the hole was the only bearing for the rod. To reduce wear, the holes are now elongated to a point where the entire flat surface of the U-shaped section is utilized as a bearing, as shown in the inset at the right. The installation shown here is in the plant of an automotiv accessories manufacturer, where the belt conveys stampings through warm caustic cleaning solution. The belts are made of cold-rolled strip steel, electrogalvanized to resist rust, or of stainless steel



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perhaps a slight modification in analysis; the result is a slight sacrifice in the over-all rust-resisting ability but this does not prove objectionable.

In a session devoted to toolroom practices, presided over by Frank R. Palmer, Carpenter Steel Co., Reading, Pa., there was considerable discussion of methods of writing the best tool steel specifications. Drawing, both from the standpoint of time and temperature, was discussed at length as was also the significance of torsion-impact peaks. Other subjects discussed were the relative merits of quenching in brine and fresh water and the effect of interrupted quenching in both water and oil. It was stated that more hardening troubles resulted from underheating than overheating.

Colonel Ragsdale's talk not only involved the design and materials employed in the construction of the new light-weight railroad equipment, but also covered the economics involved. Only two railroads now make a profit on their passenger business, whereas approximately all the railroads make a profit on their freight business. That means, he said, that the possibilities for introducing light-weight equipment are best in the passenger field. Eventually, however this development also will spread to freight equipment.

In Mr. Johnson's talk it was shown that the army airplanes of latest design are built of highly selected materials. Aluminum alloys comprise almost 70 per cent of their weight, while alloy steels comprise almost all of the remainder. Stainless steel is applicable to airplane construction, in Mr. Johnson's opinion, but its use is held up by the fact that there are no stainless steel minded aviation engineers who are prepared to go to the trouble of developing the special designs and shop methods required to make stainless steel planes. It is difficult to see any prospect for the wide use of diesel engines in the construction of airplanes in the near future, he said. Spot welding in building airplanes continues experimental.

Mr. Watson's talk presented a summary of the metals which are used in the construction of today's high-speed, long-lived automobiles. In discussing the 109 steels in the specifications of the Society of Automotive Engineers, Mr. Watson pointed out that the automobile companies are trying to effect a reduction in this number. (see p. 17).

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Send Them Home!

SUPREME COURT disapproval of NRA has given the administration an opportunity to prove its good faith with the American people. Some 4500 government employes in Washington will be discharged June 16 when the unconstitutional legislation expires. Let the administration send these people home. Get them out of Washington.

Already, every bureau chief is being put under pressure by politicians to create jobs for them. New Deal leaders are sitting up nights to plan new bureaus to employ their henchmen who will be released by NRA. It is time for the American people to call a halt on this political racket.

The country can afford to be generous with those who are losing their jobs. Let the government offer them, in consideration of their leaving Washington permanently, three months' or six months' pay and expenses for employes and their dependents. But the country cannot afford to be generous any longer to politicians who are filling some 60 government bureaus with their constituents and creating new bureaus to take care of the overflow.

Send these people who will be discharged away from Washington—the farther away the better. They are bureau-minded. Unless they are sent away and kept away from Washington the politicians will find jobs for them meddling in matters in which the government has no right to meddle.

Unpopular

An enthusiastic welder recently discovered a number of gas cylinders in a scrap yard. They had been discarded and holes burned in them because they were dented, corroded and otherwise unsafe. After welding the holes the welder tried to sell the cylinders for gas storage. Failing in this, the presumption is his enthusiasm led him to dispose of them for air tanks, steam headers, miniature boilers and similar uses. The temptation to "make something" out of scrap is a dominant vice among welders.

In Milwaukee several years ago, a welder bought short lengths of scrap I-beams, welded them together end to end to make long beams for store fronts. He used bare wire arc welding with no scarfing.

Experimenting with other people's safety is not against the law; it is just unpopular with the other people.

Sparks and Flashes

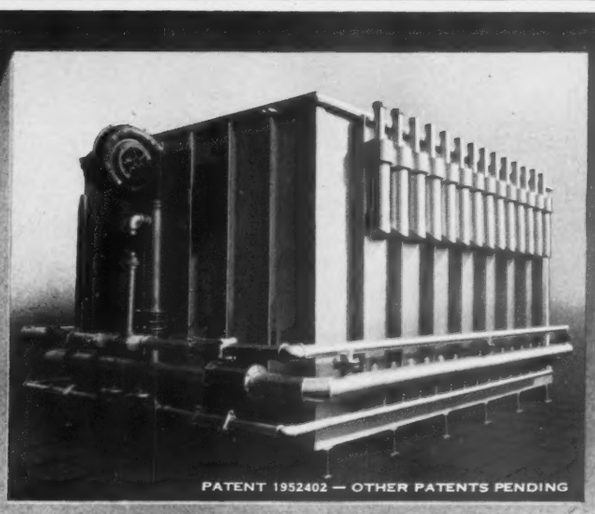
The highest award of the German engineering profession was made to Dr. Elihu Thompson on the occasion of his eighty-second birthday recently. Dr. Thompson is probably the most distinguished living American inventor and is responsible for development of more welding than any other single man. The Thompson process is well known. In addition, he has been the source of inspiration of several other processes. Rich in honors, the twilight of his useful life finds the world of engineers paying homage to his genius by applying his ideas.

* * *

Working stress of 21,000 pounds per square inch on 60,000 pounds per square inch ultimate strength steel for oil storage tanks is common. Urge for lower cost is still present. Gentlemen who have seen a wreck of one of these 110-foot diameter tanks will hesitate to take the bottom curb angle off the tank. It seems to us that lower welding cost and higher tensile steel is a safer solution to the problem of lower cost.

* * *

Bill Lavigna, chief draftsman for the Lincoln Electric Co., gives the following recipe for a highball: 1½ ounces gin, 1½ ounces Sloe gin, 1½ ounces bourbon whiskey, lemon juice and a layer of ginger ale on top. He calls this Thermit No. 2. Formula for Thermit No. 1 is furnished only to men over 40 with no dependents.



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IMPROVING OPEN-HEARTH FURNACE DESIGN

by William C. Buell Jr.

Chapter I — Part I

Layout

BEGINNING with the issue of Oct. 3, 1932 and continuing weekly until Aug. 14, 1933, a series of 45 articles under the above title and authorship was published in STEEL. These articles covered the design and construction of the upper basic open-hearth furnace or that part at or above the charging floor.

In the original articles the premise was taken that in the production of steel by the open-hearth process, the upper furnace, its design, construction and operation, is of first importance to the economical conduct of the process, that all of the ancillary apparatus of the system, slag pockets, regenerators, flues, waste-heat boilers, furnace control, etc., was but a minor means to an end, and in no sense an end in themselves individually or collectively.

For instance, combustion air preheated by apparatus other than the conventional regenerator arrangement would be equally effective and thus to improve operation or economy the upper furnace must be brought to its maximum condition of operating effect as the first and most important step of any program seeking to benefit the quality or cost of steel ingots which from any viewpoint are the major aims of the steel producer.

If the pre-eminent importance of the upper furnace to the steelmaking functions has been established and can be so acknowledged then, and only then, should we turn to the ancillary apparatus of the open-hearth system for consideration of the possibility of the further betterment of the operation of the upper furnace through improvements of the auxiliaries of the system.

This work then treats of the system that is under the charging floor. Structurally the below floor design is much simpler than that above; the problems of refractory economy and maintenance are much less important, but the factors of heat transfer and fluid flow are of equal import with those of the upper furnace.

A comparison of the quantities and costs of the two major items of open-hearth furnace construction, refractories and steel as used in the upper furnace and lower system are interesting at this time and are shown in Table LXXXVIII. The figures were taken from the cost schedule of furnace L but would be typical for any well designed 150-ton furnace.

Limitations May Be Encountered

The general layout arrangements of the lower system likely are to be more circumscribed and hampered by the necessities of building design than the upper furnace, and further the water table of the plant location may limit severely the depth to which desirable subgrade construction may be carried.

Fig. 108 gives an excellent idea of the principal structural limitations of layout that likely will be encountered. The slag pockets, fantails, and regenerator chambers, are located directly under the charging floor.

The charging floor of the modern open-hearth plant is of necessity perhaps the most substantially designed structure of industry. Immediately in front of the furnace doors is the charging track which must support drags of loaded charging buggies and the appropriate locomotives. The tracks for the charging machines, with charging machine clearances up to 35 feet are next in order, and the floor area over which the charging machines operate customarily is designed to support loadings of 1000 to 1500 pounds per square foot and even these loadings must be exceeded occasionally.

The hot metal track is next in the arrangement with design requirements for the support of the ladle car carrying the ladle with its 50 to 75 tons of molten iron and the appropriate locomotive.

In the well designed open-hearth plant having 100-ton, or larger, furnaces the centers of the girders supporting the charging cranes will be in the neighborhood of 80 feet which will indicate that the charging floor sup-

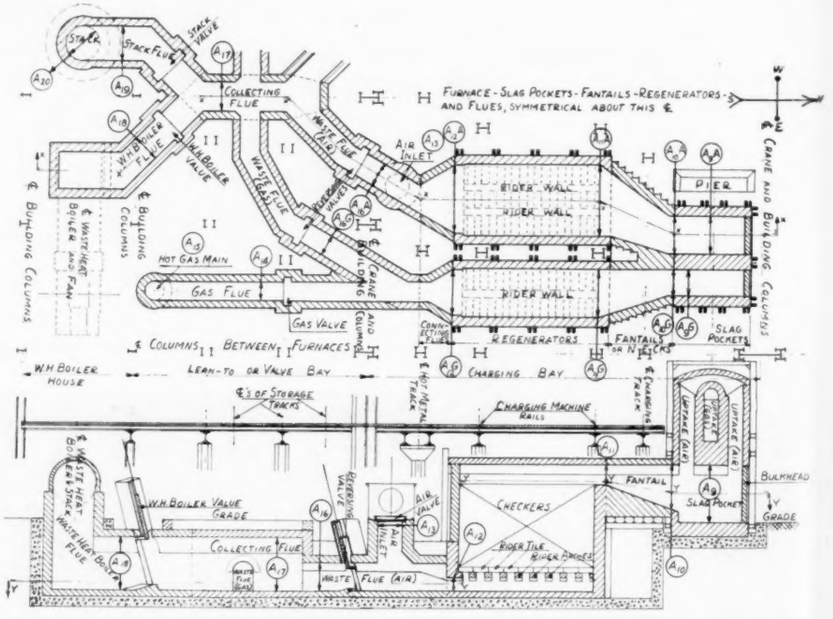


Fig. 108—Typical layout of ancillary system of an open-hearth furnace firing producer gas, locating the critical areas, showing their designation (encircled) and indicating the approved nomenclature

porting beams must not be of considerable depth if the supporting columns are widely spaced. Closer spacing of the columns will reduce the depth of the floor beams but more columns may offer serious interference or abridgment to the furnace system layout. Thus a compromise must be sought that will afford the least possible interference with the desirable features of the furnace system.

Lean-to Is Essential

There should be a lean-to adjoining the charging floor. The floor of the lean-to at the same elevation as that of the charging floor perhaps will, have two tracks for the delivery, transfer or temporary storage of loaded charging buggies, and the unloading of refractories, ferroalloys and other supplies used in operation. This floor may also contain bins for the more convenient storage of much used supplies as well as other items incidental to operation. This lean-to may have a width of 45 or 50 feet and with the charging floor width, will be the maximum width of the area at grade into which the entire ancillary system of the furnace must be placed with the possible exception of the stack, which may be located in the open, beyond the lean-to. The total width in these respects as found in the typical furnaces of existing plants is as in columns h and i, Table LXXXIX.

The ground length available for the inclusion of the auxiliaries of any furnace will not exceed the distance center to center of the building columns between which a furnace is located. This is shown in Tables LXXXIV and LXXXV to be from 75 to about 105 feet, and lengths approaching the latter figure are necessary for unabridged design.

The height of the space available for the inclusion of the ancillary apparatus will be the difference of elevation between the top of the charging floor and grade minus the thickness of the charging floor and the depth of its supporting beams, but plus the depth of the subgrade to which regenerator chamber and flue construction may be carried conveniently. The apropos data of depth as found in the typical furnaces are listed in columns b to f, Table LXXXIX.

Table LXXXVIII

Comparison of Cost of Material

	Upper furnace	Ancilliary system
REFRACTORIES:		
Quantity*.....	130,000	800,000
Cost in place.....	$23,000	$62,000
STEEL:		
Weight, tons.....	280	311
Cost in place.....	$30,000	$32,000

*Equivalent number of 9-inch standard brick.

In chapter VIII, Volume 2 of the author's book on "Open-Hearth Design," which will be published later, it is shown that to include a 150-ton furnace of unabridged upper furnace design, a building column spacing 100 to about 105 feet is necessary, and that but few of the typical furnaces are enclosed in buildings having ample length in this respect. This represents but one of the three dimensions of building layout that has a great effect in correct furnace design.

The second building dimension of importance to the design of the furnace is that of charging floor height above grade. From column b of Table LXXXIX it will be seen that in the cited plants this dimension varies from 16 feet as a minimum, to 21 feet as maximum. A height of 20 to 21 feet has been found as most satisfactory from the viewpoint of pit operation. The ladles and slag pots when placed in tapping position clear the pit floor nicely and the requirements of the pouring crane lift for teeming are reasonable.

If the charging floor is substantially less than 20 feet above grade, pits may be required to correctly register the ladles and slag pots in the tapping position and it may be difficult if not impossible to secure satisfactory slag pocket and regenerator height.

While in many older plants it is difficult to develop ramps or trestles of sufficient length to give 20 feet of elevation without an excessive grade for train and locomotive operation, the especial desirability of this charging platform height warrants the statement no new construction will be undertaken without making provision for the charging floor to be at this height or more.

Ramps Prevent Improvement

The case of one of the large steelworks containing several small noneconomical open-hearth plants is typical of the condition. For several years they have been essaying to design one modern plant with 150-ton furnace units to take the place of the several small furnace plants but have been obliged to forego this improvement owing to the impossibility of developing and including the ramps necessary to elevate the rail transportation to the 20 foot charging floor.

The width of the charging bay, column h, Table LXXXIX varies within comparatively small limits.

There will be a small difference of clearance over the charging car, charging machine and hot metal tracks, all of which material handling equipment will be included in large tonnage plants. The width of any furnaces of productive tonnage will vary but a few feet, while the variation in the location of the furnace centers with regard to the building column g, Table LXXXIX, is not great being principally governed by the location of the ladle stands and the clearance of the ladle hook of the pouring crane. Thus, the usual width of the space under the charging floor is well defined.

If there is a lean-to, then the space thereunder generally is available for the flues, valves, and waste-heat boiler, and the regenerators may be developed to excellent advantage.

Table LXXXIX

Building Layout of Typical Open-Hearth Furnaces

Plant	Length: Centers of bldg. cols. feet-inches	Height: Grade to top charging floor feet-inches	Height: Clearance top leg. steel and top charging floor feet-inches	Height: REGENERATOR STEEL: Above grade feet-inches	Height: REGENERATOR STEEL: Below grade* feet-inches	Height: REGENERATOR STEEL: Total feet-inches	Width: Center of bldg. cols. to C.L. of furnace feet-inches	Width: Charging bay feet-inches	Width: Lean-to, feet-inches
Group A	a	b	c	d	e	f	g	h	i
A	85 0	18 6	3 11	14 7	10 0	24 7	15 0	85 0	45 0
J	103 4	20 6	4 0	16 6	10 3	26 9	....	72 0	43 0
K	96 0	20 6	....	....	....	....	....	83 0	60 0
N	85 0	18 6	3 11	14 7	12 0	26 6½	14 6	85 0	45 0
O	85 0	18 6	3 11	14 7	12 0	26 6½	14 6	85 0	45 0
Group B									
L	110 0	20 5½	5 3½	15 2	13 6	28 8	....	....	....
P	78 6	16 3	4 1½	12 1½	13 11½	26 1	15 0	85 0	None
Group C									
G	100 0	16 0	3 11	12 1	13 5½	25 6½	14 9	75 0	12 0
L	105 0	21 0	4 5½	15 11½	16 5	32 4½	....	82 7	49 3
Group D									
B	75 0	17 11¼	4 5¾	13 5½	10 6	23 11½	14 1	79 3	26 0
D	82 0	19 1½	4 0	15 1½	8 3½	23 5	17 0	78 6	....
E	84 0	19 6	6 7½	12 10½	10 6	23 4½	16 0	85 6	12 0
H	80 0	16 5½	3 7	12 10½	10 9	23 7	15 0	83 0	41 6
F	91 0	19 0	4 9	14 3	10 0	24 3	16 7	83 8	15 0
M	82 0	19 1½	4 0	15 1½	8 3½	23 5	12 0	78 6	....

*Grade to top of concrete pad under regenerator brickwork.

Where there is no lean-to of substantial width, however and the flues, valves and perhaps the waste-heat boiler in part must be included in the layout under the charging bay, then the conclusion may be foregone that the entire auxiliary system must be abridged substantially in its design to the great detriment of overall operating economy and other effects.

There is a fourth dimension that has a considerable bearing on the design factors of the regenerators. This is the depth to which refractory construction may be carried below the ground elevation.

Most steel plants are built on low ground immediately adjacent to lakes or rivers. Consequently, the water table at the particular plant, primarily, governs this dimension.

Near the Great Lakes where the water table virtually is constant a favorable subgrade regenerator depth generally may be arranged even to extend below the water level, but conditions in this respect are much more difficult when the steel plant is located on a river.

Considerations of water level have in all cases influenced the developed dimensions of column e, Table LXXXIX.

Lined with Steel Plate

The bottoms of the regenerators of furnaces P and G extend below the normal water table and consequently the concrete tub, normally supporting the regenerators and protecting the subgrade structure of all furnaces are in the cases mentioned lined with steel plate to assure freedom from seepage. Nearly all of the other regenerator tubs are water-proofed by chemical methods. Lack of subgrade depth may curtail regenerative effects severely.

The order in which the typical furnaces are listed herein is based on the fuel with which they are fired. The A group, furnaces A, J, K, N and O use producer gas. Those of group B, furnaces I and P, although designed for producer gas firing actually are operated on fixed fuel. Group C, furnaces G and L are fired with mixed coke oven-blast furnace gas, and the balance, furnaces B, D, E, H, F and M, group D, use one or more of the fixed fuels, oil, tar, coke oven, natural gas, etc., all of which are interchangeable in the same furnace with appropriate modification of the combustion equipment.

Since the type of fuel used will play an important role in the design of certain of the ancillary components the grouping as previously mentioned is continued herein on account of its convenience.

In the prior writings virtually complete data has been presented covering the detailed design of a 100-ton furnace as representing the smallest furnace desirable in present day productive operation, a 150-ton furnace, as representing the most satisfactory unit size of contemporary practice, and a 350-ton furnace as representing the probable maximum size that might be contracted.

On account of the large number of limitations of space affecting the design of the principal components of the ancillary system and the infinite number of the arrangements and sizes of these components that are possible, typical design data are offered herein only for a 150-ton furnace. However, by following the principles expounded, and after giving cognizance to the space limitations, and selecting the best layout to meet the particular conditions encountered, the parallel design of the ancillary system for furnaces other than 150 tons should not be difficult.

Heat Is Recovered

The principal object of the auxiliary open-hearth system, or that below the charging floor is the return of waste heat to the furnace operation, as sensible heat in the gaseous fuel and/or the combustion air, and without which effects it would be impossible to economically create the process temperatures.

The salvage of heat from the voiding furnace gases and its return to the operation in fuel or air is accomplished in the regenerator chambers, the most influential items of the auxiliary system, and the invention of Karl Wilhelm Siemens. The correct design of the regenerators is important if the maximum economic salvage of waste heat is to be secured. The regenerative influence on operation is entirely thermal.

The slag pockets are second in importance of the auxiliary system in operating effects. Actually they are enlarged chambers in which the voiding furnaces gases are cleaned as completely as possible of entrained slag, molten and spalled refractory, oxides and dust given up by the bath, and incombustible matter or ash, introduced with the fuel or resulting from its combustion.

Design Is Important

Slag pocket arrangements are important for if poorly designed and of insufficient slag holding capacity, considerable quantities of solid matter will be carried into the regenerators and deposited on the checkers, lessening the heat transfer quantities of the checker work, interfering with the flow of the fluids and ultimately causing operating interference that may necessitate a shut-down for cleaning, or requiring a premature rebuilding that shortens a furnace campaign and increases rebuilding costs.

The valves, which must be of approved design and size and properly located, are indispensable to correct and satisfactory operation. A few years ago several different designs were in general use but today only two or possibly three different types generally are considered desirable.

The waste-heat boiler if correctly installed and operated exerts absolutely no effect on furnace operation, its function being to salvage large quantities of heat at low temperature that cannot be returned economically to the operation through regenerative action.

Operations Is Selective

The flues are the ducts that connect the principal components in such a manner as to allow their selective operation as required. The fantails, connecting the slag pockets and regenerators are actually flues within the meaning of the term.

The design of the flues is of much importance to operation. Those parts that are of too little transverse area, or which contain too great a summated angularity of bends and turns may interfere with furnace draft and thus curtail production.

With natural draft operation, the stack or chimney has the two functions of creating the draft necessary to move the combustion and process gases from the furnaces through the auxiliary system, and of voiding the gases to the atmosphere at sufficient elevation to prevent their diffusion at or near ground level.

Fig. 108, shows a typical layout and elevation of the auxiliaries, and indicates the nomenclature that will be followed. The locations indicated by the letter (A) with the subtended figures are the critical areas as found in the below floor system, and the development of which to the appropriate dimension is of the utmost importance to all phases of operation.

(*To be continued*)

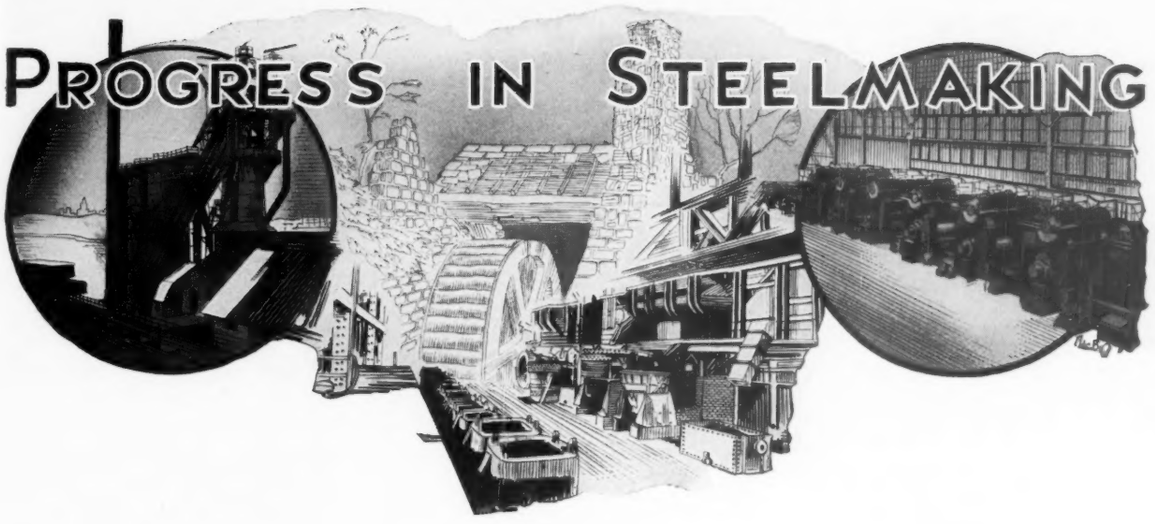
New Trade Index for Canada Lists Manufacturers

Canadian Trade Index, published by Canadian Manufacturers Association Inc., Toronto, Ontario; 842 pages, cloth bound; furnished by STEEL, Cleveland, for $6.15, postpaid; and in Europe by Penton Publishing Co. Ltd., Caxton house, Westminster, London.

Demonstrative of the changes in business institutions, this 1935 edition of the *Canadian Trade Index*, contains a total of 10,659 revisions from the previous issue. The book is divided into five sections, the first being a special export section. This contains a wealth of data on the status of Canadian foreign trade.

Probably the most valuable to American companies is the second section, containing an alphabetical list of manufacturers, with addresses, branches, trade marks, names of branches and products, and export representatives.

Second in value is the directory of manufacturers in Canada classified according to product. A produce export section lists the major products exported from Canada and the names of the principal exporters. The last section is an index in French to the articles manufactured in Canada.



Appearance Is Duplicated

Steel panels are made to look like marble, even to its coloring, and steel tables and chairs to have the appearance of the rarest kinds of woods by a combination of steel and photography. The application of photography is a commercial outgrowth of a bonded steel, developed in Pittsburgh, by which a zinc alloy, laid hot over steel, becomes part of the steel, and metallizes any coating laid upon it. Photographs of models are printed on sheets of paper which is saturated with a resin and laid over the bonded metal. The resin and metal then are subjected to 1500 pounds pressure at high temperature, this treatment hardening the resin. This results in a panel which has the appearance of marble and wears like metal. The resin may be any color or colorless.

• • •

Coating Is Acid Resistant

A transparent liquid, which may be brushed or sprayed on either the exterior or interior of metal, wood, stone or concrete now is being marketed. At normal temperatures it is claimed to resist strong hydrochloric acid and solutions of sulphuric and nitric acids as well as ammonia and dilute caustics. The product is highly suitable for pickling departments.

• • •

Markets New Refractory

Low porosity, volume stability at high temperatures and high resistance to thermal changes are claimed for a recently introduced superfireclay brick. This new refractory is finding extended use in the construction of roofs of various types of heating furnaces. Practically complete linings of this material are being installed in electric arc furnaces which produce special irons.

• • •

Uses Alloy Steel Girders

Alloy steel was used exclusively for the girders of a 300-ton steelworks crane, recently built for a large steel company to afford lighter weight for the same strength.

• • •

Increases Wear Resistance

Maximum wear from the blades of exhauster fans that take powdered coal from the pulverizing mills is obtained by a simple treatment recently developed by a company after a series of tests. Blades of different materials and types including alloy and heat treated steels were tried but the lowest exhauster maintenance was obtained by employing a blade cut out of boiler plate and coated with a layer of chilled cast iron. Blades made of uncoated boiler plate averaged 2600 hours service compared to an average campaign of 6000 hours with blades overlaid with chilled cast iron. To prevent warping during the coating operation the blade is clamped to a flat steel plate submerged in a tank of running water. Cast iron in rod form then is supplied with an electric arc using reversed polarity and approximately 300 amperes. The overlay affords a hard surface having high wear-resisting qualities.

If you desire further information on any idea, announcement, lead or suggestion presented, please write us. Perhaps you know of an idea or "shop wrinkle" that has effected a reduction in operating costs at your plant. If so, won't you send it along?

The Editors

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Insulation Is Efficient

One open-hearth shop has found that 1½ inches of silica sand and a 2 to 3-inch layer of granulated blast furnace slag placed on top of the sand makes a good furnace roof insulation.

• • •

New Type Metal Developed

Strength and hardness of alloy steels with exceptional resistance to heat and corrosion are combined in a recently developed metal. The new product is especially useful for turbine blades and pump rods and for installations operating at high temperatures.

• • •

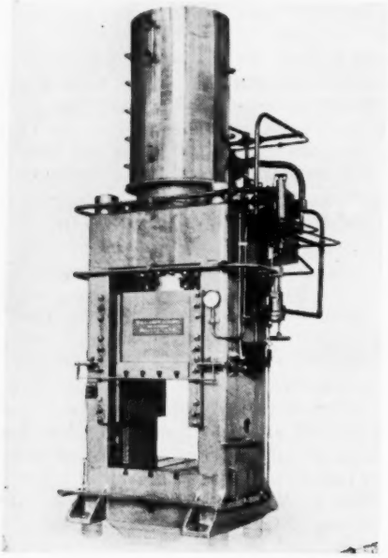
Repels Cooling Water

Grease used on roll necks of steel mill installations usually should be water repellent. Satisfactory results have been reported with lime-lead soap-sulphur greases, as well as with lime soap sulphurized base and lime soap-sulphur-chloride base.

NEW EQUIPMENT

Straightening Press—

Williams, White & Co., Moline, Ill., recently developed a 750-ton straightening press for large malleable castings. This unit, shown herewith, is a completely self-contained, hydraulic press of the rigid frame type, with tie rods shrunk in place and the ram guided on the cast housing with adjustable gibs. Control of the ram is through foot treadle and hand lever operation designed so that the press will make one complete cycle with the depression of the treadle, stopping in the up position. Stop position at the top of stroke is adjustable to set for short strokes. An adjustable time delay is furnished to change the length of dwell under high pressure before the automatic reversal of the ram.



Williams, White & Co. straightening press for large malleable castings

Rapid traverse of the slide to and from the work is accomplished by kicker cylinders, and an automatic surge valve fills the cylinder during the traverse stroke. A press of the capacity shown (750 tons) is capable of 12 strokes per minute. Hydraulic pressure is furnished by a rotary pump, with unloading control which permits it to hold full volume until full predetermined and pre-set pressure is reached.

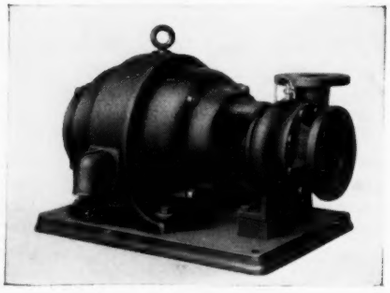
A safety switch is furnished by which the slide may be immediately returned to the top of stroke from any point of stroke. These presses can be furnished in capacities of 200, 300, 450, 600, 750, and 1000 tons.

♦ ♦ ♦

Centrifugal Pumping Units—

Worthington Pump & Machinery Corp., Harrison, N. J., recently added two larger units to its line of Monobloc centrifugal pumping units. The new pumps, shown herewith, of sizes 3 and 4-inch, are essentially similar in design to the smaller units of the line. These larger units, besides being rigidly mounted on the motor frame, are supported by a foot resting on the base. The pump impeller is mounted directly on the motor shaft and both pump and motor are bolted to one rigid base, thus relieving the pump from possible pipe strain. Additional improvements are in impeller design, renewable wearing rings, and balance rings that eliminate end thrust and put the stuffing box under suction pressure only.

A choice of a variety of material combinations permits selection of the pumps for a widely diverse character of service. In the matter of fittings, these pumps can be furnished in standard bronze, all bronze, or all iron.

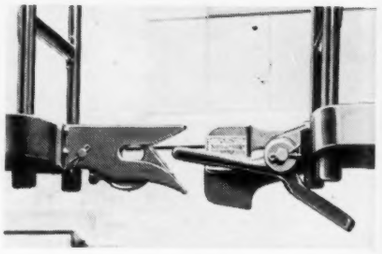


Worthington centrifugal pump

♦ ♦ ♦

Safety Self-Coupler—

Mercury Mfg. Co., 4119 South Halsted street, Chicago, recently bought out a safety self-coupler of improved design for use on industrial trailers. The new flat-top coupler jaw design is installed flush with the trailer deck, and its smooth top offers no obstruction when an overhanging load is carried on the trailer. A latch dog moves downward to open, and this bottom-release action may be accomplished by a pressure of the foot on either side pad. Dog release pads are easily reached even if the load overhangs the end of the trailer.



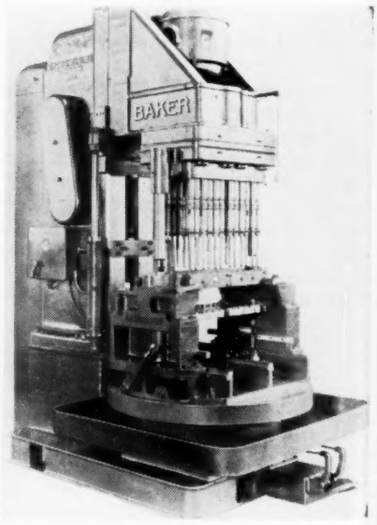
Mercury self-coupler

This improved self-coupler design, shown herewith, enhances safety of operation, as there is no need for the operator to go between two trailers to uncouple, and no temptation to use the hands. The latch spring is entirely enclosed within the jaw casting, protected against moisture and dirt.

♦ ♦ ♦

Hydraulic Feed Multiple Spindle Machine—

Baker Bros. Inc., Toledo, O., recently brought out a new model ver-



Baker No. 30-HO hydraulic feed vertical multiple spindle machine

tical hydraulic feed machine in which are provided rapid traverse speeds, and an automatic cycle, allowing for one or two feeds in connection with a positive stop and delayed reverse for facing and like operations. The machine is designed in view of adaptation of large size multiple heads with rigidity in main column to allow for accuracy of operations with overhangs required in connection with large size multiple spindle heads.

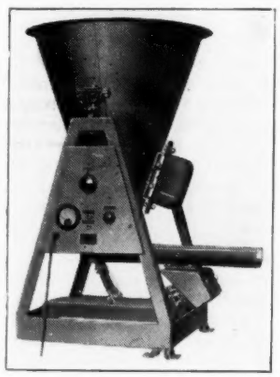
The unit, shown in the illustration on page 60, is furnished for second boring and reaming valve guide holes, and finish boring valve throats and chamfering for valve seats. Operations are performed in a new model 6 cylinder motor block, requiring extreme accuracy and high production. Hydraulic feed pump and oil pump are contained in the main frame with a self-contained motor drive to the pump.

Saddle on which is mounted the head bracket is 40 inches in length and is arranged with taper take-up gib between the ways of the main frame. Head bracket is made of ample size and well ribbed to allow for mounting in multiple head of size 18 x 26 inches. Motor for driving the 24-inch spindles in rotation is mounted on the saddle bracket with a direct coupled drive to the main driver shaft in the multiple head.

♦ ♦ ♦

Dry Chemical Feeders—

Syntron Co., 400 North Lexington avenue, Pittsburgh, recently brought out pulsating electro-magnetic dry chemical feeders designed primarily for treating drinking water and boil-



Model FM 1-25 Syntron dry chemical feeder

er feed water, in addition to its other industrial applications. Dry feeding is claimed to enable a closer control of chemical dosage, thus providing a direct saving in the amount of chemical materials used.

These dry feeders consist of a pulsating horizontal stainless steel feeder trough fed from a supply hopper. Rate of flow of the dry materials through the feeder trough is in proportion to the amplitude of pulsation of the trough's electromagnet, and is controlled electrically from the control panel.

Hopper contents are kept agitated and in a free-flowing state at all times by a separate small pulsating electromagnet vibrator. The units are designed to handle all types of dry chemicals, ranging from fine amorphous types like carbon, to pebble lime. Both models of Syntron feeders are equipped with galvanized iron hoppers, riveted and soldered to form and finished with aluminum paint. Model FM 1-25 is shown in the accompanying illustration.

♦ ♦ ♦

Spot Welders—

Pier Equipment Mfg. Co., 1280-1290 Milton street, Benton Harbor, Mich., recently placed on the market a new line of electric spot welders. These units, one of which is shown herewith, are smaller than most conventional types but are built to provide continuous operation on jobs where from 16 to 26 gage steel

Electric spot welder built by Pier Equipment Mfg. Co.

is used, the manufacturer sets forth.

While designed for continuous production, these welders also fill a definite need in sheet metal job shops. Two models now are available; the No. 40 with foot pedal control and steel stand for 110-220 volts, 60 cycles, will handle up to 600 welds per hour on 24 gage steel; the No. 50 with foot pedal control and stand is for use on 220 volts, 60 cycles and will handle up to 1200 welds per hour on 24 gage material, and about 600 welds per hour on galvanized iron.

♦ ♦ ♦

Hand Grinder—

Chicago Wheel & Mfg. Co., 1101 West Monroe street, Chicago, recently introduced a new grinder, shown herewith. Through the use of new materials weight has been reduced to 15 ounces though the tool has a speed of 25,000 revolutions per minute and ample power to drive a variety of different accessories. Aluminated Duraluminum is employed in the body of the tool while molded Bakelite parts are used as bearing

Small hand grinder introduced by Chicago Wheel & Mfg. Co.

retainers and for end caps. The new "DeLuxe Hand-ee" tool is 6 inches long overall and 1⅝ inches in diameter.

Housing is streamlined with no obstructions of any kind. This is achieved through the use of a new type radial commutator and new S type built-in switch with sliding contacts. Heat has been entirely eliminated due to a radically new type fan mounting.

Due to the extremely light weight convenient size and novel design, the new grinder, shown herewith, can be held as one would a pencil. The tool finds many uses for cleaning casting molds, reaching inaccessible places in castings and similar parts. With polishing wheels it can be used for polishing any type of metal bringing it to a brilliant finish in seconds. By the use of a novel drum, patterns, wood parts, in fact any material can be smoothed and sanded.

♦ ♦ ♦

Flexible Couplings—

Lovejoy Tool Works, 5018 West Lake street, Chicago, recently developed type P flexible couplings which have individual free-floating load cushions hung between jaws on removable studs. These new flexible couplings are available for shaft diameters from three to ten inches. The cushion material is either a long wearing brake lining material, employed for heavy shock loads; leather for use on sustained loads and when greater misalignment exists; or rubber duck fabric, vulcanized under pressure, for use on fluctuating loads and where high resilience is required.

Load cushions are in plain sight for inspection at all times and can be removed and replaced in a few minutes when necessary. There is no wear on the iron or steel jaws. No lubrication is required. In operation, one half of the cushions are idlers (except on reversing load); hence there always is a set of new cushions in the coupling. This feature eliminates shut-downs, as load cushions can be easily and quickly interchanged without dismantling the coupling.

New Trade Publications

KILN ENDS—Chicago Steel Foundry Co., Kedzie avenue and Thirty-seventh street, Chicago, has published a folder on its pyrasteel kiln ends for use in the cement mill.

POWER PRESSES—Niagara Machine & Tool Works, Buffalo, in bulletin No. 63-B features its series 50 single crank power presses, with illustrations and full descriptions.

SAFETY TREADS — Norton Co., Worcester, Mass., is distributing a 12-page pamphlet showing application of its new alundum rubber-bonded safety tread.

SILICA STONE—Cleveland Quarries Co., Builders Exchange building, Cleveland, has published a bulletin on its silica stone for acid tanks, steel pickling tanks and acid wash trays.

INSULATING BRICK—Charles Taylor Sons Co., Cincinnati, has issued a bulletin on its refractory insulating brick for furnace linings. Test and performance results are included.

GAS ENGINES—Worthington Pump & Machinery Corp., Harrison, N. J., has prepared a catalog on its gas engines. Special emphasis is placed upon the features of design and construction.

CUTTER GRINDING—Surfacer Mfg. Co., 2452 Irving Park boulevard, Chicago, features its No. 2 universal cutter grinder, designed to keep cutting tools at a high efficiency, with gains in production.

BRONZE FITTINGS—Walworth Co., 60 East Forty-second street, New York, in two current bulletins describes its line of threadless bronze fittings for bronze pipe, and its brazing method of making joints.

BERYLLIUM COPPER — American Brass Co., Waterbury, Conn., in its publication B-21, second edition, describes its beryllium copper, a heat-treatable alloy. Data tables and illustrations supplement the text.

FIRST-AID—Burroughs Wellcome & Co., 9 East Forty-first street, New York, has prepared a catalog on its line of first-aid products for industry. Numerous first-aid kits are illustrated, with the contents listed.

RUBBER — Thiokol Corp., Yardville (Trenton), N. J., has issued two pamphlets which give information on its oilproof synthetic rubber and a list of manufacturers of finished products made from that material.

CONVEYORS — Standard Conveyor Co., North St. Paul, Minn., has published a catalog on its line of conveyors for steel mill and foundry service. Photographs illustrate application of the conveyors. Both power and gravity conveyors are shown.

NAILS—Information on its line of nails, including those for foundry use, is contained in a folder recently published by the Angell Nail & Chaplet Co., 4580 East Seventy-first street, Cleveland.

TRANSMISSION—A practical analysis of the fundamentals of industrial power transmission is presented in a 36-page booklet by the Power Transmission council, 370 Lexington avenue, New York.

PLATE SIZE CARD—Lukens Steel Co., Coatesville, Pa., has issued a card showing sizes of sheared or flame-cut steel plates produced in its mills, as a guide to purchasers. It shows thicknesses up to 25 inches and widths up to 186 inches.

PROCESS EQUIPMENT—J. P. Devine Mfg. Co. Inc., Mt. Vernon, Ill., has issued a condensed general catalog, No. 105-B, describing its complete line in brief form, including four pages of charts and tables of interest to engineers.

DIAMONDS — "Let's Stop Talking About Diamonds and Talk About What They Do," is the title of a folder issued by the Koebel Diamond Tool Co., Detroit. The folder describes the factors to be considered in purchasing diamond tools.

AIR HOISTS—Curtis Pneumatic Machinery Co., Wellston postoffice, St. Louis, in bulletin No. C-27 suggests methods of cutting costs by use of its air-power cranes and hoists. Illustrations suggest uses and show details of construction and operation.

DUST REMOVAL—U. S. Hoffman Machinery Corp., air appliance division, New York, has published a 15-page bulletin showing applications of its stationary type vacuum cleaning equipment. The firm also makes portable equipment.

GEARS—Medart Co., St. Louis, has published an 80-page catalog giving detailed information on the various types of gears and sprockets which it manufactures. These include spur, bevel, miter and worm gears, sprockets and pinions.

LUBRICATION—Fiske Bros. Refining Co., Lubriplate division, 20 State street, New York, in the March issue of its lubrication bulletin calls attention to advantages of this lubricant in various classes of machinery and for other uses.

DIAMONDS—Anton Smith & Co., 24 State street, New York, has published a four-page folder on industrial diamonds. Included are historical data, characteristics and classification of diamonds. Detailed information is given on carbons, ballas and boarts.

SAND TESTING—Harry W. Dietert Co., 676 West Grand boulevard, Detroit, has published catalog No. 103, devoted to its line of foundry and testing and control equipment. Several new units recently developed are included in the catalog.

FURNACE LININGS—McLeod & Henry Co., Troy, N. Y., has prepared catalog No. 235, dealing with furnace linings and arches, including information on design, installation and service advantages for modern boiler furnaces. The publication is well illustrated with drawings showing methods of application.

BLAST CLEANING—W. W. Sly Mfg. Co., 4700 Train avenue, Cleveland, has published a bulletin on its blast equipment for cleaning castings. Illustrations show the equipment ready for receiving work to be cleaned, method of drive, bearing support, and the unit in operation.

NOZZLES—Advantages of Norbide pressure blast nozzles are described in a recent bulletin of the Norton Co., Worcester, Mass. Data also are given on nozzle sizes, adaptor numbers and dimensions of special types of nozzles and instructions for the selection and use of the Norbide nozzle.

METERS — General Electric Co., Schenectady, N. Y., has published a 56-page catalog giving detailed information on its demand meters, for measurement of maximum power demands and its allied problems. The line includes indicating, graphic and printing types for all classes of service.

COMPRESSORS—A discussion of the application of turbo-compressors to foundry cupolas, oil and gas fired furnaces and ovens, is contained in a recent catalog of the Spencer Turbine Co., Hartford, Conn. Data on construction of the compressor is presented and the advantages are discussed.

TOOLS—Eclipse Counterbore Co., Detroit, has made a marked departure from previous catalogs in its current catalog No. 35, which is in looseleaf form, so that later pages can be inserted and the book kept up to date. Illustrations of unusual merit are included, with ample data on the tools, featuring the new radial drive counterbore for high production.

SAFETY INFORMATION — Mine Safety Appliances Co., Braddock, Thomas and Meade streets, Pittsburgh, has prepared a publication "Carbon Monoxide, the Killer," which discusses the cause of the fourth largest group of occupational diseases, accidents and deaths. Equipment which may be used to prevent this hazard is described and illustrated.

SPECIAL STEELS—Allegheny Steel Co. has issued a pamphlet for users of corrosion resistant steels covering fabrication properties. The corrosion resistant steels surveyed cover three groups: Austenitic, martensitic and ferritic. In brief manner various types of welding, shearing, forming, drawing, blanking, punching, machining, spinning and riveting are discussed with recommendations in each case.

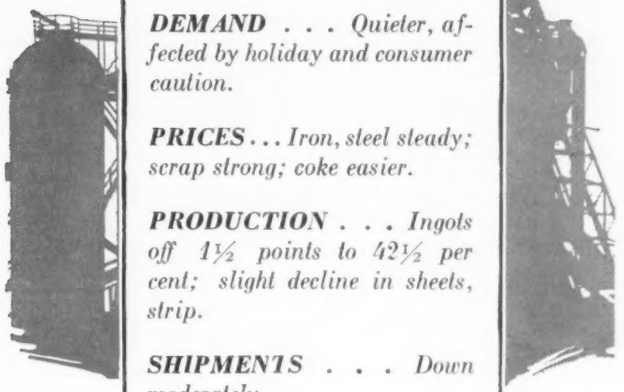
METAL BENDINGS—Bulletin No. 28 has been issued by Wallace Supplies Mfg. Co., 1310 Diversey parkway, Chicago, manufacturer of bending machines, describing a new bending service offered by this company. Various sizes of bends and applications for bent sections of pipe, tubes, conduit, angles, channels, hexagons, I-beams and squares are described. Uses of metal bendings in the manufacture of a number of products are illustrated.

Prices Hold; Buyers Wait; Ingots Off to 42½

Open Market Resists

First Test; Consumer

Requirements Lighter



MARKET IN TABLOID

DEMAND . . . *Quieter, affected by holiday and consumer caution.*

PRICES . . . *Iron, steel steady; scrap strong; coke easier.*

PRODUCTION . . . *Ingots off 1½ points to 42½ per cent; slight decline in sheets, strip.*

SHIPMENTS . . . *Down moderately.*

ON THE surface, iron and steel markets last week were little affected by the Supreme Court's NRA decision.

Prices—uncontrolled for the first week since Aug. 19, 1933—apparently were as steady as at any time since the code was adopted.

Production yielded more to holiday influences, and steel ingot output dropped 1½ points to 42½ per cent.

Producers and consumers, however, were keenly alert to the potentialities of a suddenly unrestrained market. Steelmakers gave every indication of their intention to adhere to the principles of their code. Just as prescribed by the rules, they opened books Saturday, 30 days before the beginning of the third quarter, at unchanged prices for that period, as announced officially ten days ago.

First reaction from buyers was a flood of inquiries for "real", or inside, prices. Some offered to place orders at lower figures; a tempting tonnage of steel sheets was held before a Pittsburgh interest. A few even claimed to have received lower quotations on steel strip.

At this stage, there is virtually a deadlock between producers and consumers; the former standing firm; the latters' strategy being to wait.

Steelmakers also appear determined to uphold the fair trade practices of their code, and to maintain present wage rates. It seems possible that some adjustment will be made in hours of labor to facilitate economical operation, as some costs may be reduced by lengthening the work day or week; which, it is felt, employes themselves would welcome.

The general opinion is that the industry is about to make certain changes which were considered bound to come in any normal process of recovery, and that these will be completed during the dull summer months, preparatory for a vigorous upturn in the fall. Leading steelmakers now believe more steel will be made in the last half of the year than in the first.

Iron and steel specifications during the week were in lighter volume, actual consumer requirements being lower. Automobile assemblies declined 36,000 units to 65,000, a reduction considerably in excess of that which could be ascribed to the holiday.

Structural shape awards were down to 6440 tons, though bids were opened on three western public works projects requiring a total of 25,000 tons. Chesapeake & Ohio's inquiry for 5125 freight cars and five locomotives calls for 65,000 tons of steel. This is the largest demand for cars since the Van Sweringen lines awarded 13,000 last year. Texas & Pacific placed 7500 tons of rails; Canadian Pacific 7000 tons. A western road purchased 1500 tons of sheets for car roof repairs.

Scrap prices are strong due to light supplies. In beehive coke and coal, where numerous code violations have been reported recently, prices are weaker. More Russian pig iron is offered along the Atlantic seaboard $1 a ton under domestic prices, and a cargo of 2500 tons of Dutch iron has arrived at Boston, tending to unsettle the market there.

Pittsburgh steelworks operations last week were down 2 points to 36 per cent; Chicago 1 to 43; Youngstown 2 to 48; Wheeling 6 to 62. New England was up 3 to 63, and other districts were unchanged.

STEEL's iron and steel price composite has advanced 2 cents to $32.43, on a rise in some grades of scrap; the finished steel index is unchanged at $54, and the scrap composite remains $10.50.

COMPOSITE MARKET AVERAGES

	June 1	May 25	May 18	One Month Ago May, 1935	Three Months Ago March, 1935	One Year Ago June, 1934	Five Years Ago June, 1930
Iron and Steel.....	$32.43	$32.41	$32.34	$32.35	$32.26	$32.96	$33.28
Finished Steel	54.00	54.00	54.00	54.00	54.00	55.08	52.37
Steelworks Scrap	10.50	10.50	10.29	10.27	10.75	10.32	13.11

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	June 1, 1935	May, 1935	Mar., 1935	June, 1934
Steel bars, Pittsburgh	1.80c	1.80c	1.80c	1.90c
Steel bars, Chicago	1.85	1.85	1.85	1.95
Steel bars, Philadelphia	2.11	2.11	2.09	2.19
Iron bars, Terre Haute, Ind.....	1.75	1.75	1.75	1.85
Shapes, Pittsburgh	1.80	1.80	1.80	1.85
Shapes, Philadelphia	2.01½	2.01½	2.00½	2.05½
Shapes, Chicago	1.85	1.85	1.85	1.90
Tank plates, Pittsburgh	1.80	1.80	1.80	1.85
Tank plates, Philadelphia	2.00	1.99	1.98½	2.03½
Tank plates, Chicago	1.85	1.85	1.85	1.90
Sheets, No. 10, hot rolled, Pitts...	1.85	1.85	1.85	2.00
Sheets, No. 24, hot ann., Pitts....	2.40	2.40	2.40	2.65
Sheets, No. 24, galvan., Pitts.....	3.10	3.10	3.10	3.25
Sheets, No. 10, hot rolled, Gary..	1.95	1.95	1.95	2.10
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.75
Sheets, No. 24, galvan., Gary.....	3.20	3.20	3.20	3.35
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.....	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.60	2.60	2.60	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$30.00
Sheet bars, open-hearth, Pitts.....	28.00	28.00	28.00	30.00
Billets, open-hearth, Pittsburgh....	27.00	27.00	27.00	29.00
Wire ends, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

	June 1, 1935	May, 1935	Mar., 1935	June, 1934
Bessemer, del. Pittsburgh	$19.81	$19.80	$19.76	$19.76
Basic, Valley	18.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.....	19.76	19.81	19.76	19.76
No. 2, foundry, del. Pittsburgh.....	19.31	19.30	19.26	19.26
No. 2, foundry, Chicago	18.50	18.50	18.50	18.50
Southern No. 2, Birmingham.....	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia..	20.68	20.68	20.63	20.63
Malleable, Valley	18.50	18.50	18.50	18.50
Malleable, Chicago	18.50	18.50	18.50	18.50
Lake Superior charcoal, del. Chi.	24.25	24.25	24.04	24.04
Ferromanganese, del. Pittsburgh..	90.13	90.13	89.79	90.00
Gray forge, del. Pittsburgh	18.67	18.66	18.63	18.88

Scrap

Heavy melting steel, Pittsburgh....	$12.50	$12.00	$12.40	$11.90
Heavy melt. steel, No. 2, east. Pa.	9.25	9.25	9.15	8.95
Heavy melting steel, Chicago	10.25	10.20	10.45	9.75
Rails for rolling, Chicago	11.25	11.05	11.55	11.25
Railroad steel specialties, Chicago	11.75	11.40	11.55	11.25

Coke

Connellsville, furnace, ovens.....	$3.60	$3.60	$3.60	$3.60
Connellsville, foundry ovens.....	4.60	4.60	4.60	4.60
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Prices are code levels filed with American Iron and Steel Institute, 350 Fifth avenue, New York. Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered..	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.17c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered..	2.53c
Detroit, delivered....	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered..	3.23c
Philadelphia, del	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.42c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered..	3.07c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered....	2.70c
Philadelphia, del.	2.81c
New York, del.....	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered....	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10..	2.50c
Pittsburgh, No. 20..	3.10c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base con. (box) Pitts...	$5.25
Do., waste-waste..	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp...	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered....	2.22c
Buffalo, delivered....	2.05c
Chicago or Gary.....	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.07c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered....	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

Pittsburgh	1.80c
Chicago or Gary	1.85c
Duluth	1.95c
Birmingham	1.95c
Cleveland	1.85c
Buffalo	1.90c
Detroit, delivered....	1.95c
Pacific ports, f.o.b. cars, dock	2.35c
Philadelphia, del.	2.11c
Boston, delivered....	2.22c
New York, del.	2.15c
Pitts., forg. qual.....	1.95c-2.05c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.91c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail Steel

Straight lengths quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; pool cars, or less, 15c up. 10% dis. on nail extras on stright or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.45c

Alloy	S.A.E.	Diff.	S.A.E.	Alloy Diff.
	2000	0.25	3100	0.55
	2100	0.55	3200	1.35
	2300	1.50	3300	3.80
	2500	2.25	3400	3.20
4100	0.15 to 0.25 Mo			0.50
4600	0.20 to 0.30 Mo. 1.25-1.75 Ni.			1.05
5100	0.80-1.10 Cr.			0.45
5100	Cr. spring			base
6100	bars			1.20
6100	spring			0.70
	Cr., Ni., Van.			1.50
	Carbon Van.			0.95
9250	Carbon base plus extras			

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23½-in.	
Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop,	
Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip,	
Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	70-10-5 off
Rolled thread, ½ x 6, smaller	70-10-5 off

Machine Bolts

All sizes cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts stud bolts	70-10-5 off
Tire bolts	60-5 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	70-10-5 off
Step bolts	70-5 off
Elevator bolts	70-5 off

Nuts

S.A.E. semifinished hex.;	
½ to ⅞-inch	70-10-5 off
Do., ½ to 1-inch	70-10-5 off
Do., over 1-inch	70-5 off

Hexagon Cap Screws

Milled	85-10 off
Upset, 1-in., smaller	87½ off

Square Head Set Screws

Upset, 1-in., smaller	80 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

Butt Weld

Steel	Blk.	Gal.
In.		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.60
Connellsville, fdry.	4.60
Connel. prem. fdry.	5.10
New River fdry.	6.00
Wise county fdry.	4.45- 5.25
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol	15.00c	
Toluol	30.00c	
Solvent naphtha	30.00c	
Commercial xylol	30.00c	

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	4.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del...	14.50	14.50	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.08	.....	18.96	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.93	22.43	.....	.....
Brooklyn, N. Y., from Bmghm..	21.55	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.38	.....	19.40	.....
Cleveland from Birmingham	19.04	.....	18.92	.....
Indianapolis from Hamilton, O..	20.93	20.93	20.43	21.43
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.57	19.57	19.07	20.07
Muskegon, Mich., from Chicago, Toledo or Detroit	21.60	21.60	21.10	22.10
Newark, N. J., from Birmingham	20.61	.....	.....	.....
Newark, N. J., from Bethlehem..	20.99	21.49	.....	.....
Philadelphia from Birmingham....	19.93	.....	19.1	.....
Philadelphia from Swedeland, Pa.	20.31	20.81	19.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	20.75	20.75	20.25	20.25

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	19.00	19.00	18.50	.....
St. Louis from Birmingham	†18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63.

Gray Forge		Charcoal	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.25
		Lyle, Tenn.	21.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

First Quality.

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	45.00
Second Quality	
Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00
Ohio	
First quality	$40.00-45.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	42.50
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$18.75-19.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$13.00-14.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsburgh	90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	90.00
2% carbon, 95.00; 1%,	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous Prices

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
May 25	9.00	9.12½	8.00	52.00	51.20	4.25	4.10	4.30	*19.00	12.75	35.00
May 27	9.00	9.12½	8.00	51.70	50.85	4.35	4.20	4.30	*19.00	12.75	35.00
May 28	9.00	9.12½	8.00	51.70	50.95	4.35	4.20	4.30	*19.00	12.75	35.00
May 29	9.00	9.12½	8.00	51.30	50.55	4.35	4.20	4.30	*19.00	12.75	35.00
Holiday											
May 31	9.00	9.12½	8.00	51.45	50.60	4.25	4.10	4.30	*19.00	12.75	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	14.25
Copper, hot rolled	16.00
Lead, cut to jobbers	8.00
Zinc, 100-lb. base	9.50
Tubes and Pipes	
High yellow brass	16.00
Seamless copper	16.25
Rods	
High yellow brass	12.75
Copper, hot rolled	13.25
Anodes	
Copper, untrimmed	13.75
Wire	
Yellow brass (high)	14.75

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
New York	4.75- 5.00
Cleveland	5.25- 5.50
*Chicago	4.87½-5.12½
*St. Louis	5.25- 5.50
Heavy Copper and Wire	
New York, No. 1	6.12½-6.37½
*Chicago, No. 1	6.12½-6.37½
Cleveland	5.75- 6.00
St. Louis, No. 1	6.50- 6.75
Composition Brass Borings	
New York	4.12½-4.37½
Light Copper	
New York	5.00- 5.25
*Chicago	4.62½-4.87½
Cleveland	4.75- 5.25
St. Louis	5.25- 5.50
Light Brass	
*Chicago	2.50- 2.75
Cleveland	2.75- 3.00
St. Louis	2.75- 3.00
Lead	
New York	3.12½- 3.25
*Cleveland	3.12½- 3.50
*Chicago	3.25- 3.50
St. Louis	3.30- 3.40
Zinc	
New York	2.12½-2.37½
Cleveland	2.12½-2.37½
St. Louis	2.65- 2.75
Aluminum	
*Borings, Cleveland	8.00- 8.50
*Mixed, cast, Cleve.	12.75-13.00
Mixed, cast, St. L.	13.00-13.25
Clips, soft, Clev.	14.00-14.50
SECONDARY METALS	
Brass ingot, 85-5-5-5	8.00
*Stand. No. 12 Alum.	15.75-17.00

Iron and Steel Scrap Prices

Corrected to Friday night Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.00
Boston, dock, expt.	8.50
Boston, domestic	7.00- 7.25
Buffalo, No. 1	11.00-11.50
Buffalo, No. 2	9.50-10.00
Chicago, No. 1	10.00-10.50
Cleveland, No. 1	9.00- 9.50
Cleveland, No. 2	8.50- 9.00
Detroit, No. 1	8.00- 8.50
Detroit, No. 2	7.00- 7.50
Eastern Pa., No. 1	10.50
Eastern Pa., No. 2	9.00- 9.50
Federal, Ill.	8.00- 8.50
Granite City, R. R.	8.50- 9.00
Granite City, No. 2	7.50- 8.00
N. Y., deal, No. 2	7.00
N. Y., deal. barge	8.50
Pittsburgh, No. 1	12.25-12.75
Pittsburgh, No. 2	10.50-11.00
St. Louis	7.50- 8.00
Valleys, No. 1	11.50-12.00

COMPRESSED SHEETS

Buffalo, dealers	9.50-10.00
Chicago, factory	8.50- 9.00
Chicago, dealer	7.50- 8.00
Cleveland	8.00- 8.50
Detroit	8.50- 9.00
E. Pa., new mat.	9.50
Pittsburgh	12.25-12.75
St. Louis	6.25- 6.75
Valleys	11.00-11.50

BUNDLED SHEETS

Buffalo	7.00- 7.50
Cincinnati, del.	6.50- 7.00
Cleveland	6.00- 6.50
Pittsburgh	10.50-11.00
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	6.00- 6.50
Cincinnati	6.00- 6.50
Detroit	5.00- 5.50
St. Louis	4.25- 4.75

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	12.50-13.00
Chicago (3 ft.)	12.50-13.00
Chicago (2 ft.)	13.00-13.50
Cincinnati, del.	11.50-12.00
Detroit	10.50-11.00
Pitts., open-hearth, 3 ft. and less	14.50-15.00
St. Louis, 2 ft.& less	12.00-12.50

STEEL RAILS, SCRAP

Boston	7.00- 7.25
Chicago	10.50-11.00
Pittsburgh	13.00-13.50
St. Louis	9.50-10.00

STOVE PLATE

Birmingham	5.75- 6.00
Boston, dealers	3.75- 4.00
Buffalo	9.25- 9.75
Chicago, net	6.00- 6.50
Cincinnati, dealers	6.00- 6.50
Detroit, net	5.75- 6.25
Eastern Pa.	8.50
N. Y., deal. fdry.	6.00
St. Louis	5.50- 6.00

COUPLERS, SPRINGS

Buffalo	12.75-13.25
Chicago, springs	11.50-12.00
Eastern Pa.	13.50
Pittsburgh	14.50-15.00
St. Louis	8.50- 9.00

ANGLE BARS—STEEL

Chicago	13.00-13.50
St. Louis	9.50-10.00

RAILROAD SPECIALTIES

Chicago	11.50-12.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	12.75-13.25
Cleveland, billet, bloom crops	14.00-14.50
Eastern Pa., crops	13.00-14.00
Pittsburgh, billet, bloom crops	15.50-16.00
Pittsburgh, sheet bar crops	14.00-14.50

FROGS, SWITCHES

Chicago	10.00-10.50
St. Louis, cut	9.50-10.00

SHOVELING STEEL

Chicago	10.00-10.50
Federal, Ill.	7.50- 8.00
Granite City, Ill.	7.50- 8.00

RAILROAD WROUGHT

Birmingham	8.00- 8.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	9.50-10.00
Buffalo, No. 2	11.00-11.50
Chicago, No. 1, net	8.50- 9.00
Chicago, No. 2	10.00-10.50
Cincinnati, No. 2	8.00- 8.50
Eastern Pa.	10.50-11.00
N. Y., No. 1, deal.	7.25- 7.75
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	8.25- 8.75

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	9.00- 9.50
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	9.50-10.00
Chicago, No. 1	8.50- 9.00
Cinci., No. 1, deal.	6.00- 6.50
Cincinnati, No. 2	3.25- 3.75
Cleveland, No. 2	6.00- 6.50
Detroit, No. 1, new	7.00- 7.50
Valleys, new, No. 1	10.50-11.00

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	2.00- 2.25
Buffalo	4.50- 5.00
Chicago	5.00- 5.50
Cincinnati, dealers	4.00- 4.50
Cleveland	5.00- 5.50
Detroit	4.50- 5.00
Eastern Pa.	6.00- 6.50
New York, dealers	2.50- 2.75
Pittsburgh	8.75- 9.25
St. Louis	2.25- 2.75
Valleys	8.25- 8.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	6.00- 6.50
Cincinnati, dealers	4.00- 4.50
Cleveland	6.00- 6.50
Detroit	4.75- 5.25
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	6.50- 7.00

CAST IRON BORINGS

Birmingham, plain	3.50- 4.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	6.00- 6.50
Chicago	5.00- 5.50
Cincinnati, dealers	4.00- 4.50
Cleveland	6.50- 7.00
Detroit	4.75- 5.25
E. Pa., chemical	11.00-12.00
New York, dealers	1.50- 1.75
St. Louis	2.00- 2.50

PIPE AND FLUES

Cincinnati, dealers	5.00- 5.50

RAILROAD GRATE BARS

Buffalo	7.50- 8.00
Chicago, net	6.00- 6.50
Cincinnati	4.50- 5.00
Eastern Pa.	8.50
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	4.75- 5.00
Buffalo	9.50-10.00
Cleveland	8.00- 8.50
Detroit	7.00- 7.50
Pittsburgh	10.50-11.00

FORGE SCRAP

Boston, dealers	4.50- 4.75
Chicago, heavy	10.50-11.00
Eastern Pa.	9.50-10.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	3.00- 3.50
Buffalo	7.50- 8.00
Chicago, elec. fur.	9.50-10.00
Cleveland	7.00- 7.50
Eastern Pa.	9.50
St. Louis	7.00- 7.50

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	10.00-10.50
Buffalo	12.50-13.00
Chicago, net	13.50-14.00
Eastern Pa.	16.00
St. Louis	12.00-12.50

SHAFTING

Boston, ship. point.	11.75-12.00
Eastern Pa.	17.00
New York, dealers	13.00-13.25
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00-10.00
Boston, iron deal.	5.25- 5.50
Buffalo, iron	11.00-11.50
Buffalo, steel	12.75-13.25
Chicago, iron	10.50-11.00
Chicago, rolled steel	11.00-11.50
Cincinnati, iron	8.50- 9.00
Eastern Pa., iron	11.00
Eastern Pa., steel	13.50
Pittsburgh, iron	12.50-13.00
Pittsburgh, steel	14.50-15.00
St. Louis, iron	8.00- 8.50
St. Louis, steel	10.50-11.00

NO. 1 CAST SCRAP

Birmingham	8.50- 9.50
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	7.50- 8.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	10.75-11.25
Buffalo, mach.	10.50-11.00
Chicago, agri. net	7.50- 8.00
Chicago, auto	9.00- 9.50
Chicago, mach. net	9.50-10.00
Chicago, railr'd net	8.00- 8.50
Cinci., mach. cup	9.00- 9.50
Cleveland, cupola	11.50-12.00
Detroit, net	9.50-10.00
Eastern Pa., cupola	11.00-12.00
E. Pa., mixed yard	8.50- 9.50
Pittsburgh, cupola	12.75-13.25
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	8.00- 8.50
St. L., No. 1 mach.	9.00- 9.50

HEAVY CAST

Boston, del.	5.00- 5.25
Buffalo, break.	8.50- 9.00
Cleveland, break.	7.50- 8.00
Detroit, No. 1, mach. net	10.00-10.50
Detroit, break.	7.00- 7.50
Detroit, auto net	10.50-11.00
Eastern Pa.	10.50-11.00
N. Y., break. deal.	6.25- 6.75
Pittsburgh	11.75-12.25

MALLEABLE

Birmingham, R. R.	10.50-11.00
Boston, consum.	12.00-12.50
Buffalo	13.00-13.50
Chicago, R. R.	13.50-14.00
Cincinnati, agri. del.	8.75- 9.25
Cleveland, rail	12.00-12.50
Detroit, auto	10.00-10.50
St. Louis, R. R.	10.50-11.00
Eastern Pa., R. R.	11.00-11.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.50-11.00
Boston, dealers	8.00- 8.50
Buffalo	11.00-11.50
Chicago	11.00-11.50
Eastern Pa.	12.50-13.00
New York, dealer	7.50- 8.00
St. Louis	10.00-10.50

LOCOMOTIVE TIRES

Chicago (cut)	12.00-12.50
St. Louis, No. 1	9.00- 9.50

LOW PHOS. PUNCHINGS

Buffalo	12.50-13.00
Chicago	12.50-13.00
Eastern Pa.	13.00-14.00
Pittsburgh (heavy)	13.50-14.00
Pittsburgh (light)	13.00-13.50

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ores

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. low phos.	10.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.75-18.25
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-19.50

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.95c
Boston††	3.00c
Buffalo	3.00c
Chattanooga	3.31c
Chicago	2.95c
Cincinnati	3.17c
Cleveland	2.95c
Detroit	3.04c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.06c
New Orleans	3.30c
New York‡(d)	3.26c
Pittsburgh (h)	2.90c
Philadelphia*	2.93c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.19c
St. Paul	3.00c
Tulsa	3.25c
IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.17c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.19c
Tulsa	3.25c
REINFORCING BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.24c
Tulsa	3.25c
Young.	2.30c-2.60c
SHAPES	
Baltimore*	3.00c
Boston††	3.20c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.98c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c
PLATES	
Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, ⅜-in.	3.65 c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c
NO. 10 BLUE	
Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.70c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.29c
St. Paul	3.45c
Tulsa	3.70c
NO. 24 BLACK	
Baltimore*†	3.60c
Boston (g)	3.95c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.07c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New York	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.09c
St. Paul	3.695c
Tulsa	4.75c
NO. 24 GALV. SHEETS	
Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.50c
New York	4.50c
Philadelphia*†	4.30c
Pitts** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.79c
St. Paul	4.19c
Tulsa	5.10c
BANDS	
Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York(d)	3.56c
Philadelphia	3.18c
Pittsburgh(h)	3.20c
Portland	4.25c
San Francisco	4.25c
Seattle	4.25c
St. Louis	3.54c
St. Paul	3.20c
Tulsa	3.45c
HOOPS	
Baltimore	2.30c
Boston	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York	3.56c
Philadelphia	3.43c
Pittsburgh(h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.54c
St. Paul	3.75c
COLD FIN. STEEL	
Baltimore (c)	3.58c
Boston	3.75c-3.90c
Buffalo (h)	3.40c
Chattanooga*	3.98c
Chicago (h)	3.35c
Cincinnati	3.57c
Cleveland (h)	3.35c
Detroit	3.49c
Los. Ang.(f) (d)	5.70c
Milwaukee	3.46c
New Orleans	4.15c
New York	3.81c-4.31c
Philadelphia	3.61c
Pittsburgh	3.20c
Portland (f)	5.85c
San Fran.(f) (d)	5.80c
Seattle (f) (d)	5.85c
St. Louis	3.59c
St. Paul	3.05c
Tulsa	4.50c
COLD ROLLED STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.44c
Cleveland (b)	3.20c
Detroit	3.33c
New York	3.36c
St. Louis	3.36c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70–5
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, May 29

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons	
			Quoted in dollars at current value	**Quoted in gold pounds sterling
PIG IRON	£ s d			£ s d
Foundry, 2.50-3.00 Silicon	$15.41	3 2 6	$13.83	1 14 0
Basic bessemer	15.41	3 2 6*	13.01	1 12 0
Hematite, Phos. .03-.05	15.53	3 3 0	.....	.....
SEMIFINISHED STEEL				
Billets	$27.12	5 10 0	$19.12	2 7 0
Wire rods, No. 5 gage	41.91	8 10 0	36.61	4 10 0
FINISHED STEEL				
Standard rails	$38.21	7 15 0	$44.74	5 10 0
Merchant bars	1.65c	7 10 0	1.15c to 1.20c	3 2 6 to 3 5 0
Structural shapes	1.62c	7 7 6	1.14c	3 1 6
Plates, †¼ in. or 5 mm	1.76c	8 0 0	1.52c	4 2 6
Sheets, black, 24 gage or 0.5 mm	2.04c	9 5 0	2.14c	5 16 0††
Sheets, gal., 24 gage, corr.	2.48c	11 5 0	3.22c	8 15 0
Bands and strips	1.87c	8 10 0	1.47c	4 0 0
Plain wire, base	2.04c	9 5 0	1.97c	5 7 6
Galvanized wire, base	2.37c	10 15 0	2.30c to 2.34c	6 5 6 to 6 7 6
Wire nails, base	2.64c	12 0 0	2.12c	5 15 0
Tin plate, box 108 lbs.	$ 4.44	0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.64	3 7 6(a)	$17.16	260	$12.65	370	$25.41	63
Basic bessemer pig iron	16.64	3 7 6(a)*	12.21	185	11.29	330	28.04 (b)	69.50
Furnace coke	4.07	0 16 6	7.92	120	3.76	110	7.66	19
Billets	27.12	5 10 0	28.38	430	18.47	540	38.93	96.50
Standard rails	1.82c	8 5 0	2.08c	694	1.76c	1,100	2.42c	132
Merchant bars	1.89c	8 12 0	1.68c	560	.96c	600	2.01c	110
Structural shapes	1.93c	8 15 0	1.65c	550	.96c	600	1.97c	107.50
Plates, †¼-in. or 5 mm	1.99c	9 1 3	2.10c	700	1.20c	750	2.32c	127
Sheets, black	2.31c	10 10 0§	2.25c	750‡	1.32c	825‡	2.64c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	2.86c	13 0 0	4.06c	1,350	2.40c	1,500	6.77c	370
Plain wire	2.04c	9 5 0	3.39c	1,130	1.76c	1,100	3.16c	173
Bands and strips	2.06c	9 7 0	1.95c	650	1.34c	840	2.32c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed

**Gold pound sterling carries a premium of 67 per cent over paper sterling.

Bars

Bar Prices, Page 64

Pittsburgh—In some cases soft steel bar buyers have been circulating feeler inquiries for lower prices than 1.80c, Pittsburgh, but producers are firm in quoting unchanged prices. Likewise, the 2.45c, Pittsburgh, base applies for alloy steel bars, and in both cases full application of extras is continued. Buying is more cautious.

Cleveland—Specifications for carbon and alloy steel bars are lighter, partly due to reduced consumption, and in part to uncertainty regarding prices. Tonnage booked by leading producers and sellers here in May was 10 per cent less than in April. Last week shipments to automobile manufacturers were at the lowest rate of the month. The first reaction from the NRA decision was a large number of telephone calls and letters asking for prices, some consumers apparently assuming that the market would weaken. In some instances, specifications were held up while users went out of their usual sources of supply to make inquiries. Leading producers, however, held firmly to code prices and rules. A few minor adjustments, it was said, may be made regarding steel basing point regulations.

Chicago—Ending of the steel code so far has resulted in no apparent effect on bar demand, sales and specifications remaining fairly steady, though comparison with the several preceding weeks reveals a slight tendency downward. Miscellaneous consumers have limited inventories and mills anticipate little pressure on prices as a result of the lack of code support. Soft steel bars continue 1.85c, Chicago or Gary. Automotive demand is slightly less active. Requirements of farm implement manufacturers are well maintained but still are restricted in some instances by plant shutdowns as a result of labor troubles.

Boston—Commercial steel bar buying has sagged with buyers taking light shipments for immediate needs and awaiting price developments. Screw machine products and forging shops lead industrial demand, although both are less active than several weeks ago, notably the latter.

Philadelphia — Specifications for steel bars are light with prices unchanged. Sellers generally expect little immediate change in quotations but foresee pressure from automotive and oil industries for concessions since NIRA is declared unconstitutional.

New York—Commercial steel bar sellers are adhering to existing price levels. Meanwhile, apart from placing of immediate requirements, consumers are waiting developments. Some larger consumers have asked for concessions but sellers have stood pat. No requests for cancellations of existing orders have been noted, and this possibility is causing little concern to sellers as there has been virtually no forward buying in recent months.

Plates

Plate Prices, Page 64

Pittsburgh — Bids on 480 12-foot, 10-inch lengths of 28-inch land pipe and 320 12-foot, 9½-inch lengths of 21-inch land pipe for the Fort Peck dam dredges finds Taylor Forge & Pipe Works, Chicago, low at $52,856.65. Among prospective plate work is request for bids by the Tennessee valley authority, Knoxville, Tenn., June 4 for the construction of a whirler barge crane, the barge to be 62 x 38 x 6 feet and the crane boom of 75-foot length. Bids are requested June 4 by the Vicksburg, Miss., army engineers for a 140 x 36 x 7½-foot steel pump barge. Treadwell Construction Co., Midland, Pa., is low on the construction of a steel cofferdam for the Fernbank dam near Cincinnati on a bid of $18,900. American Bridge Co., Pittsburgh, is reported low on two steel tank barges for Gulf Refining Co., on which bids were closed ten days ago.

Cleveland—Chesapeake & Ohio railroad's inquiry for 5000 hopper cars issued last week will require 50,000 tons of plates, shapes and bars, mainly plates, for the bodies, and 15,000 tons for trucks, wheels, and axles. Railroads have been curtailing car repair programs recently, and it is believed more purchases of new cars may be made, in preference to patching up old equipment. Moderate size orders for plates were received during the week from manufacturers of small boilers and tanks, and high pressure vessels for the chemical industry. Builders of road machinery also placed some small tonnages. Producers generally favor continued adherence to code of fair prices and practices, as plate prices especially were subject to severe competition before the steel code was adopted. For the present, sellers have been notified to hold to code quotations.

Chicago — While plate orders are fairly steady, tonnage continues light. Only small lots are moving to railroads and freight car builders, with heavy construction work accounting for most of the business. Activity in the line pipe market is quiet. Tank work shows no improvement in orders or inquiries.

Boston — Plate consumers in some instances are pressing for price concessions and the price structure is likely to be severely tested on the next substantial tonnage. Coleman Bros. Corp., Boston, is low at $190,226.20 on 9450 feet of 40-inch steel water pipe for the metropolitan district commission, taking about 900 tons of plates. Buying is light and except for the above project inquiry is sluggish.

New York — Confusion resulting from the Supreme Court's decision on NIRA has brought plate tonnage here to the lowest point in many weeks. While producers continue to hold to existing prices, consumers in the main look for concessions and hence appear to be buying more sparingly. The navy department will open bids about June 15 on approximately 950 tons of plates.

Philadelphia—Demand for plate tonnage is at a standstill, sellers and consumers awaiting clarification of problems set up by termination of the steel code. Producers indicate the intention of adhering to code principles meanwhile.

San Francisco — Demand for plates has shown little improvement during the past six weeks. The only award of size placed went to Pittsburgh-Des Moines Steel Co. and called for 150 tons for a 150,000-gallon tank and tower for South Pasadena, Calif. An award on the Mad River pipe line, Eureka, Calif., involving 1300 tons of 10 gage plates for reinforced concrete pipe is expected to be placed with the American Concrete Pipe Co. Close to 450 tons of rods for reinforcement are also involved. Plans are under way for a pipe line for Stanford university, Calif., requiring more than 400 tons.

Seattle — There is fair demand for plates for repair work and tank construction, mainly in small lots. Reconstruction of the motor ferry KALAKALA, at Seattle, involves 500 tons of plates furnished by A. M. Castle & Co., Barde Steel Co., and Pacific Coast Steel Co., Seattle.

Contracts Placed

1075 tons, tunnel conduits, Tygart Valley dam, near Grafton, W. Va., to Treadwell Construction Co., Midland, Pa.

650 tons, land pipe, Fort Peck, Mont., bid to United States engineer, Kansas City, Mo., to Taylor Forge & Pipe Co.

600 tons, plates for 21 and 28-inch land pipe for Fort Peck, Mont., dam, to Taylor Forge & Pipe Works, Chicago.

500 tons, rebuilding motor ferry KALAKALA, Seattle, to Pacific Coast Steel Corp., A. M. Castle & Co., and Barde Steel Co., Seattle.

150 tons, plates and shapes, 150,000-gallon tank and tower, South Pasadena, Calif., to Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.

100 tons, repairs to government dredge, CULEBRA; Winslow Marine Railway & Ship Building Co., Seattle, general contractor.

100 tons, 200,000-gallon tank on 113-foot tower, Cullman, Ala., to Chicago

Bridge & Iron Works, Chicago, $10,985.

Contracts Pending

900 tons, bureau of supplies and accounts, navy, Washington, for various navy yards; bids June 18.

400 tons, welded steel pipe line for Leland Stanford university, Palo Alto, Calif.; bids soon.

Sheets

Sheet Prices, Page 64

Pittsburgh—Several sheet users late last week began testing the market by issuing inquiries with the stipulation that lower prices must be quoted by producers. One, for example, inquired for a large tonnage of a size, but was unable to break the market. Producers are firm in their policy to quote unchanged prices. Full application of extras is current. Miscellaneous demand makes up a large share of the present market. Sheet mill operations were off last week with full finished down a point to 54 per cent, operations in common black sheets down 3 points to 58 per cent, but galvanized up a point to 53 per cent. One of the largest orders in several years for galvanized sheets to be used for car tops was placed with a district mill here last week. The order is reported will involve over 1500 tons and to be used for repairing cars of a leading western railroad.

Cleveland — Sheet demand from automobile manufacturers and other leading consumers, including makers of household equipment, continues downward moderately. Ford has curtailed releases, and is understood to have slowed up work on new mill buildings. Chevrolet is operating close to capacity, although strikes persist at a few of its smaller plants, notably in Ohio. Sellers anticipate several weeks of declining specifications, pending clarification of prices and the effect of the NRA decision on steel code regulations, especially pertaining to basing points. The Newton Steel Co. resumed operations at its Monroe, Mich., sheet mills last week, after several weeks idleness following a strike. Cleveland sheet mill operations dropped 10 points to 40 per cent.

Chicago—Sheet demand is quiet though changes in sales and specifications compared with a week ago are slight. Producers indicate intentions of adhering strictly to current prices despite the lack of code enforcement and anticipate no unusual pressure on the part of consumers. Low inventories are counted on to forestall any marked postponement of buying in expectation of lower quotations. While automotive demand is less active than during the preceding several months, some recession also is noted in orders from miscellaneous consumers.

Boston—New sheet buying is off, releases being the smallest in weeks, although consumer stocks are light. Buyers, uncertain as to future prices, are marking time and taking in small shipments only for immediate needs.

New York—While sheet sellers have been approached by consumers with offers at lower prices, no concessions have been granted in any quarter so far as can be learned, sellers generally continue their adherence to the regulations set up under the code. Meanwhile, little actual tonnage is being placed. On 98 tons of license tag stock for the District of Columbia, the Apollo Steel Co. was low,, with a bid of 3.18c, delivered, as against 3.19½c, submitted by the other bidders. The difference in the two prices submitted is said to be equivalent to the freight surcharge.

Philadelphia—Sheet consumers are buying no more than necessary for their immediate requirements. Scattered requests for price concessions are receiving no encouragement from sellers, who are continuing as heretofore not only with respect to prices but code regulations generally.

Buffalo—District sheetworks are operating at 75 per cent. Unfilled orders are being reduced steadily, however, and the present rate is not likely to be maintained much longer unless demand improves.

Cincinnati—District sheet mills are operating at about 60 per cent. Buying and shipments are close to immediate needs. So far no pressure on prices has been applied as a result of the NRA decision.

St. Louis—Some slowing down in new business and specification marked the closing week of May. Total volume for the month was close to April. Miscellaneous demands predominate.

Birmingham, Ala.—Sheet production has been steady for many months, and shipments continue about equal to output. Many uses of sheets have been demonstrated in this district, co-operation with agricultural interests having developed some new business. A steel house will be exhibited in the next few weeks by the Tennessee Coal, Iron & Railroad Co.

Transportation

Track Material Prices, Page 65

Inquiry by the Chesapeake & Ohio for 5000 steel hoppers of 62½ tons capacity, 50 stock cars, 75 flat cars and five specially designed high-speed locomotives furnishes the largest car demand since February, 1934, when the same road bought 7800 cars. Steel required to cover the present inquiry will total about 50,000 tons, mainly plates, and 15,000 tons of wheels, axles and trucks. The cars will be financed by sale of equipment trust certificates and not through a PWA loan.

While it is not definite it appears that Pressed Steel Car Co., Pittsburgh, is low on 250 subway cars for the board of transportation, New York, with American Car & Foundry Co., New York, low on a similar number and Pulman-Standard Car Mfg. Co., Chicago, low on the alternate bid for 500. Aside from this and 600 box cars for the Canadian Pacific there is little activity in car inquiry. The latter may inquire later for 150 refrigerator cars in addition to the present list. The Norfolk & Southern may inquire later for 400 freight cars.

Specifications have been issued for 100 new steel cars for the Chicago Surface Lines, Chicago, following tests of three types in actual service. High-tensile, light-weight steel has been specified. Bids will be opened in a few weeks.

Purchase of 7500 tons of steel rails and appropriate fastenings by the Texas & Pacific from the Tennessee Coal, Iron & Railway Co., Birmingham, Ala., insures a longer active period for that company's rail mills than had been planned. Pacific Coast Steel Corp., San Francisco, has been awarded 235 tons of 105 and 110-pound girder rails for the San Francisco municipal railroad, instead of the Columbia Steel Co., as reported last week.

Canadian Pacific has placed 7000 tons of rails with the Dominion Steel & Coal Corp., to be rolled at its plant at Sydney, N. S.

Rail Orders Placed

7500 tons, Texas & Pacific, Tennessee Coal, Iron and Railroad Co., Birmingham, Ala.

Car Orders Pending

Canadian Pacific, 600 box cars, bids asked; may inquire for 150 refrigerators later.

Chesapeake & Ohio, 5000 steel hopper coal cars, 50 stock cars, 75 flat cars; bids asked.

Locomotives Pending

Bangor & Aroostook, two or three locomotives; in addition to two heavy mountain-type freight locomotives previously reported.

Chesapeake & Ohio, five high-speed specially designed locomotives.

Rail Orders Pending

Seattle street railway, 1000 gross tons rails; bids in.

United States engineer, Portland, Oreg., unstated tonnage of rails and accessories, June 4.

Buses Placed

Twin Coach Corp., Kent, O.: Twenty-three 30-passenger, for Tennessee Electric Power Co., Chattanooga,

Tenn.; six 30-passenger, for United Electric Railways, Providence, R. I.; four 30-passenger, for San Diego Electric Railway Co., San Diego, Calif.; four 23-passenger, for Louisville Railway Co., Louisville, Ky.; four 29-passenger, for New York State Railways, Syracuse, N. Y.

White Motor Co., Cleveland: Fifteen 32-passenger city coaches, for North Shore Bus Co., New York; five 33-passenger highway coaches, for Alabama Bus Co., Louisville, Ky.; five 29 and 33-passenger highway coaches, for Southeastern Greyhound Co. of Tennessee, Louisville, Ky.

Pipe

Pipe Prices, Page 65

Pittsburgh—Pipe prices are unchanged. A fair tonnage of oil country goods is moving, and standard pipe is currently in its best demand for several years. American Oil Co., Baltimore, expects to build a 6-inch pipe line on 18-inch supports down the right bank of the Kanawha river near Charleston, W. Va., designed for unloading gasoline from barges to its bulk station there.

Cleveland — This city is taking bids June 7 on the first section, 2½ miles, of a 14-mile sewer sludge line, requiring 600 tons of 12-inch cast pipe. Alternate bids will be taken on ⅜-inch, 12-inch diameter steel pipe. As originally planned, the complete line would require 3360 tons of cast pipe. Public works projects are lacking and only small lots of steel pipe are moving to jobbers.

Chicago—Cast pipe shipments during May were slightly better than expected, but absence of sufficient volume of new business to offset these deliveries gives a less favorable outlook for June. Inquiries also are light. Chicago is taking bids on a small tonnage of miscellaneous fittings and bends.

Boston—Cast pipe buying has not recovered from the recent slump, purchases being made in small miscellaneous lots. New inquiry is also limited and further delay is expected in allotment of funds under PWA programs which are expected ultimately to release considerable cast pipe.

New York—Sluggish inquiry for cast pipe continues. Buying has shown but little seasonable improvement this spring. This city is figuring work requiring substantial volume, but has made no formal inquiry. Purchasing is in small lots. Joseph L. Sigretto & Sons Inc., New York, is low on 950 tons of 48-inch cast pipe for Bayonne, N. J.

San Francisco—Demand for cast pipe continues to improve and a number of new inquiries have just come out for figures. On 3005 tons for Oakland, Calif., United States Pipe & Foundry Co. is low. Five projects in Utah will require close to 1200 tons.

Seattle — Indications are more promising for pipe business, although few specifications are out. Municipalities are planning extensive improvements as quickly as funds are available.

Cast Pipe Placed

765 tons, 16-inch, Fox Point, Wis., to Glemorgan Pipe & Foundry Co., Lynchburg, Va.

450 tons, castings, water department, Boston, 200 tons to Franklin Foundry Co., Boston, 250 tons to LeBaron Foundry Co., Brockton, Mass. Bids in on wrought iron pipe and fittings, same department.

140 tons, 4 to 8-inch, class 150, Inglewood, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

100 tons, 4-inch, Compton, Calif., bids rejected and pipe purchased in open market.

Unstated tonnage, Appleton, Wis., 1500 feet of 6-inch to Lynchburg Foundry Co., Lynchburg, Va., and 1000 feet of 6 and 8-inch to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

3005 tons, 4 to 20-inch, Oakland, Calif.;

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United States Pipe & Foundry Co., Burlington, N. J., low.
600 tons, 12-inch, alternate bids on 12-inch steel, sewer sludge line, Cleveland; bids June 7.
413 tons, 8 and 12-inch, also 310 tons fittings and manhole covers, department of purchase, New York, for delivery Bronx yards; bids June 10.
350 tons, 16-inch, Seattle; bids June 3.
328 tons, 2 to 8-inch, class 150, Fountain Green City, Utah; bids in.
311 tons, 2 to 8-inch, class 150, Parowan, Utah; bids in.
303 tons, 8-inch, Heppner, Oreg.; bids in.
200 tons, mostly 10-inch, Westchester county sanitary sewer commission, White Plains, N. Y.; bids June 3.
165 tons, 12-inch, also accessories, Spokane, Wash.; bids in.
158 tons, 4 and 6-inch, class 150, Santa Monica Calif.; bids in.
145 tons, 2 to 6-inch, class 150, Santaquin, Utah; bids in.
143 tons, Emerytown, Utah; bids in.
138 tons, 8 and 12-inch, Jacksonville, Oreg.; bids in.
113 tons, 6, 8 and 12-inch offset bends, Chicago; bids June 11.
100 tons, 6-inch, class 150, Eureka, Calif.; bids in.
Unstated tonnage, fittings, Chicago; bids June 6.

Copper and Brass Research association, New York, has moved its offices from 25 Broadway to 420 Lexington avenue.

SPENT PICKLING LIQUORS ARE VALUABLE!

—if you utilize the sulphur content by converting it into acid. This can now be done with additional benefits.

THE first large commercial plant for making sulphuric acid direct from waste iron sulphate solution is now in steady operation, and is so successful that its owner has a second plant of the same capacity under construction.

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CHEMICO PLANTS are PROFITABLE INVESTMENTS

Strip Steel

Strip Prices, Page 65

Pittsburgh — Little apprehension has been expressed over stability of the strip steel markets in view of the NRA debacle and hot-rolled strip has been firm at 1.85c, base, Pittsburgh, and cold-rolled strip steel at 2.60c, base, Pittsburgh or Cleveland. Practically no order cancellations have been recently issued by important strip buyers.

Cleveland—While there was no definite evidence of lower prices being quoted on hot and cold-rolled strip last week, some consumers claimed to have been offered concessions on hot strip. Sellers who held firmly to code prices were told they were "out of line" with quotations received on fairly substantial tonnages. The general uncertainty regarding prices contributed to a slower demand.

Chicago—A decrease in strip steel demand is most noticeable when compared with the volume of 30 to 60 days ago. Changes recently in specifications have been small. Stocks of consumers are light and this factor is counted on to forestall extensive delay in buying in anticipation of lower prices. Producers are adhering to former quotations of 1.95c, Chicago, for hot-rolled strip and 2.60c, Pittsburgh-Cleveland, for cold-rolled strip.

Boston—Cold strip buying is spotty. One large producer notes a steady and fairly active demand, notably from the building hardware and small tool trade. Other mills report volume sluggish.

New York—Sellers have shown no disposition to shade prices on narrow strip, and should they be able to adhere voluntarily to the pricing plan established in the steel industry under its code, steadiness may continue. Owing to existing uncertainty over the immediate future in this and other respects, business momentarily is at as low a point as has been noticed at any time this year.

Cold Finished

Cold Finished Prices, Page 65

Pittsburgh—Base price of 1.95c, Pittsburgh, for cold-finished carbon steel bars is currently reported firm. Practically no instances have been reported of order cancellation or suspension of shipments from leading cold-finished steel bar buyers as a result of voiding of the steel code's effect. Many buyers, however, are maintaining a watchful-waiting attitude and promise to continue to buy on a hand-to-mouth basis.

Shapes

Structural Shape Prices, Page 64

New York—Bids close June 6 on approximately 2500 tons, mainly structural steel for the New York approach to the Midtown Manhattan-Weehawken Hudson river tunnel. Also on 890 tons included as an alternate, steel or cast iron tunnel segments. Official estimate for the Henry Hudson bridge superstructure, closing June 14, is 6200 tons with 47 tons of miscellaneous iron. Awards are light and new inquiry shows slight improvement.

American Housing Inc., New York, purchased structural steel for 21 steel houses, for stock, from Kalman Steel Corp., Bethlehem, Pa.

Pittsburgh—The market on structural shapes continues 1.80c, base, Pittsburgh, and wide flange structurals, 1.90c, base. No instances have been reported here where structural steel users have pressed for a lower price in view of the abolition of the NRA steel code. Jones & Laughlin Steel Corp., Pittsburgh, is reported low on the 2100-ton medical center building at New Orleans.

Cleveland — Action on several industrial building projects on which fabricators figured recently has been postponed, while the Libby-Owens-Ford Glass Co., Toledo, O., has revived its inquiry for 400 tons for a building in that city. The Barber Asphalt Co., Philadelphia, has been awarded the general contract for the Main street bridge, Columbus, O., for which 600 to 800 tons of steel piling will be required. Plain structural shape prices are steady at 2.00c, delivered, Cleveland.

Chicago — Great Lakes Construction Co., Chicago, is low for the St. Louis post office general contract, the work involving 7000 tons of shapes. Bids have been opened on 1625 tons for Illinois highway bridges, while 875 tons are pending for Missouri bridges. Awards include 1000 tons for cranes for the American Sheet & Tin Plate Co. plant at Gary.

Boston—Structural steel buying is light. Several fair-size projects dependent on federal financial assistance are delayed, including schools, one at Providence, R. I., taking several hundred tons.

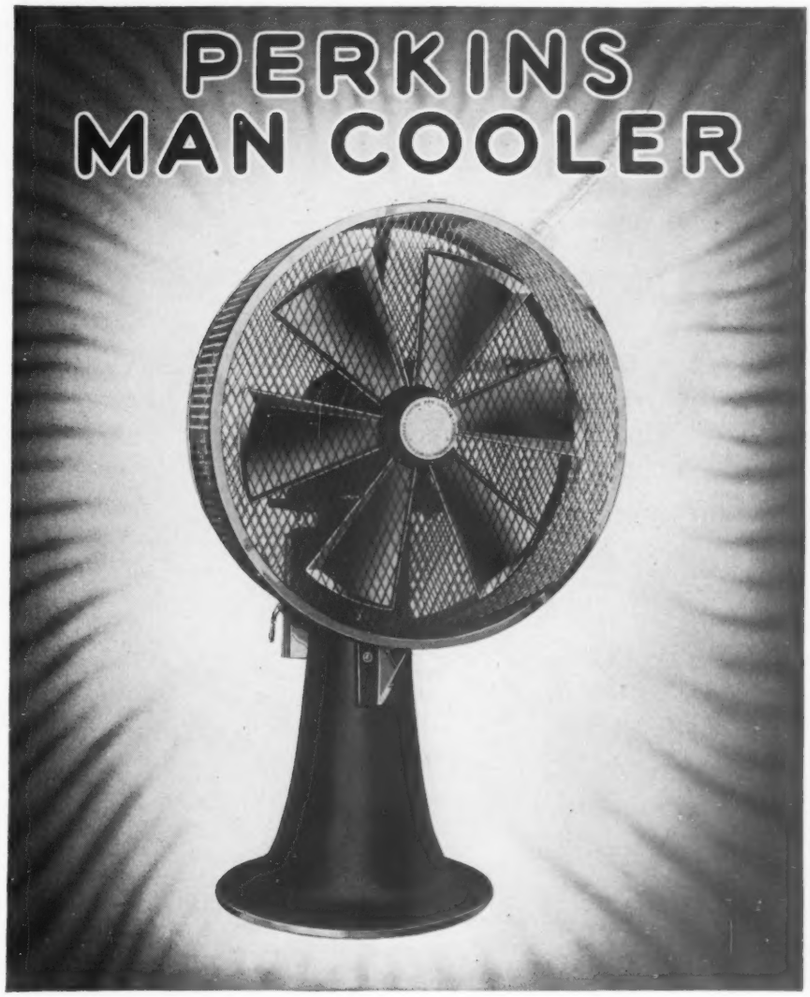
Seattle — New business is coming out in increasing volume. Bids were opened May 29 by Mason-Walsh-Atkinson-Kier, general contractors at the Coulee, Wash., dam for approximately 5000 tons for a steel trestle, and three gantry cranes, the latter requiring 800 tons. United States engineer, Portland, Oreg., is taking bids for a gantry crane at the Bonneville, Oreg. dam, involving about 1200 tons. Pacific Car & Foundry Co., Seattle, has booked 210 tons for a state crossing in Pierce county, Washington.

St. Louis—Bids will be opened by the Missouri state highway commission on June 7 for projects including 390 tons of structurals for a bridge over the Meramec river, near St. Louis. Fabricators report a dearth of large lettings. Shop operations average 25 per cent.

San Francisco—Featuring the mar-

Shape Awards Compared

	Tons
Week ended June 1	6,440
Week ended May 25	15,356
Week ended May 18	12,907
This week 1934	9,436
Weekly average, 1934	16,284
Weekly average, 1935	14,608
Weekly average, May	11,525
Total to date, 1934	391,559
Total to date, 1935	321,372



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B. F. PERKINS & SON, INC., Holyoke, Mass.
ENGINEERS AND MANUFACTURERS

ket was the opening of bids on 9400 tons of piling for the Fort Peck dam in Montana. Awards in this district in the week aggregated over 2500 tons. Bids will be called for soon on 3300 tons of piling for a seawall in Alameda, Calif., and 2000 tons for an auditorium in San Francisco.

Shape Contracts Placed

8100 tons, Harlem river lift span crossing, Triboro bridge, New York, to Taylor-Fichter Steel Construction Co. Inc., New York, with fabricating to be done by Jones & Laughlin Steel Corp., Pittsburgh, and Fort Pitt Bridge Works, Pittsburgh. Tonnage revised from 7500 tons reported in STEEL, May 27.

1000 tons, cranes, American Sheet & Tin Plate Co., Gary, Ind., to Harnischfeger Corp., Milwaukee.

430 tons, building, Merck & Co., Rahway, N. J., to Lehigh Structural Steel Co., Allentown, Pa.; through Walter Kidde Co.

415 tons, state highway bridge, Marion county, Indiana, to McClintic-Marshall Corp., Bethlehem, Pa.

400 tons, Kress company store, Nashville, Tenn., to Ingalls Iron Works Co., Birmingham, Ala.

395 tons, state bridge, NRM 3-D and 119, Wichita county, Texas, to Austin Bros., Dallas, Tex.

375 tons, gantry crane, Mare Island, Calif., to Star Iron & Steel Co., Tacoma, Wash.

300 tons, sewage disposal plant, Stickney, Ill., to Duffin Iron Co., Chicago.

300 tons, plant, Armour & Co., Chicago, to Hansell-Elcock Co., Chicago.

300 tons, shapes and plates, rebuilding motor ferry, KALAKALA, Seattle, to Pacific Coast Steel Corp., A. M. Castle & Co., and Barde Steel Co., Seattle.

292 tons, piling, Pineview dam near Ogden, Utah, to Pacific Coast Steel Corp., San Francisco.

250 tons, building, fair grounds, Syracuse, N. Y., to Belmont Iron Works, Philadelphia.

235 tons, high school, Manhasset, North Hampstead, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.; through John H. Eisele Co.

210 tons, state crossing Pierce county, Washington, to Pacific Car & Foundry Co., Seattle.

200 tons, Friends building, Westchester, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

200 tons, livestock building, Syracuse, N. Y., to Belmont Iron Works, Philadelphia.

185 tons, state highway bridge, New Orleans, to McClintic-Marshall Corp., Bethlehem, Pa.

178 tons, office building, Maytag Co., Newton, Iowa, to Des Moines Steel Co., Des Moines.

170 tons, bridge, project 9-6-PWA 26, Smith county, Kansas, to St. Joseph Structural Steel Co., St. Joseph, Mo.

165 tons, state bridge, NRS 496-C, Minnesota, to Minneapolis-Moline Power Implement Co., Minneapolis.

140 tons, building A, state school, Rome, N. Y., to Utica Structural Steel Co., Utica, N. Y.

100 tons, crane runways, metropolitan water district, Los Angeles, to Consolidated Steel Corp., Los Angeles.

100 tons, state highway bridge, NRS-8483, Oneida county, New York, to McClintic-Marshall Corp., Bethlehem, Pa.; Bates & Rogers Construction Co. Inc., New York, general contractor.

100 tons, plant, Illinois-Owens Glass Co., Bridgetown, N. J., divided between Belmont Iron Works, Philadelphia, and Frank M. Weaver, Lansdale, Pa.; 150 tons of sheets also required.

Shape Contracts Pending

9413 tons, piling, retaining wall for drain, Fort Peck, Mont.; bids opened.

7000 tons, postoffice, St. Louis; Great Lakes Construction Co., Chicago, low for general contract on bid of $3,527,253.

3300 tons, seawall, Alameda, Calif.; bids soon.

2100 tons, medical center building, New Orleans; Jones & Laughlin Steel Corp., Pittsburgh, reported low on union-erection basis.

2000 tons, auditorium, San Francisco; bids soon.

1200 tons, gantry crane for Bonneville, Oreg., dam project; bids soon by United States engineer, Portland, Oreg.

875 tons, Missouri state highway bridges.

750 tons, Liberty plaza, Allegheny county, Pennsylvania; bids June 4.

700 tons, bridge, Blodgett, Ill.; McClintic-Marshall Corp., Bethlehem, Pa., low.

600 to 800 tons, piling, Main street bridge, Columbus, O.; general contract awarded to Barber Asphalt Co., Philadelphia.

575 tons, state bridge, Verdigras, Okla.

500 tons, postoffice, San Pedro, Calif.; bids June 30.

500 tons, piling, seawall, Sausalito, Calif.; bids soon.

400 tons, building, Libby-Owens-Ford

HIGH STRENGTH "A.W." "70-90" STEEL

READILY WELDED "A.W." "70-90" STEEL

EASILY FABRICATED "A.W." "70-90" STEEL

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A super strength steel that reduces dead weight and increases pay load

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Glass Co., Toledo, O.; project revived.
375 tons, building, American Molasses Co., Brooklyn, N. Y.
350 tons, joists, Southern Pacific-Key System crossing, Oakland, Calif.
280 tons, addition to glass factory, Vernon, Calif.; bids soon.
273 tons, piling, weir across Kins river, Kingsburg, Calif.; bids soon.
250 tons, Pasadena junior college, Pasadena, Calif.; bids soon.
250 tons, postoffice station O, New York, Kenny Bros. Inc., New York, low.
212 tons, bridge, Lake county, Illinois; Milwaukee Bridge Co., Milwaukee, low.
200 tons, Luzerne county bridge, Plymouth, Pa.; previously noted as involving unstated tonnage.
200 tons, school, Haverstraw, N. Y.
170 tons, postoffice, Somerville, Mass.; bids June 10.
157 tons, state bridges in Monterey county, California; bids June 12.
150 tons, state girder bridge, Chelan county, Washington; Elliott & Co., Seattle, low.
100 tons, Benjamin Franklin school, Long Beach, Calif.; Virginia Bridge & Iron Co., Roanoke, Va., low.
100 tons, postoffice, Lodi, Calif.; bids soon.
100 tons, high school, Pittsburg, Calif.; bids soon.
100 tons, building for Betts Spring Co., San Francisco; bids soon.

Reinforcing

Reinforcing Bar Prices, Page 65

New York—Delay in the award of several of the larger projects requiring reinforcing steel is expected pending clarification of the price situation. About 2800 tons are pending, bids being in on part of the requirements. The volume required for the Henry Hudson bridge, New York, closing June 14 is below first estimates, 580 tons, 385 tons for substructure, and 195 tons for superstructure.

Cleveland — Eighteen awards, requiring several thousand tons of reinforcing bars and steel piling, are to be made by the United States engineers at Zanesville, O., for the Muskingum, O., conservancy district, on bids to be received from June 7 to 18. This will complete most of the steel material requirements. For the Main street bridge, Columbus, O., it is understood the general contractor, Barber Ashphalt Co., Philadelphia, will purchase 500 tons of rail steel bars, to be bent at the job.

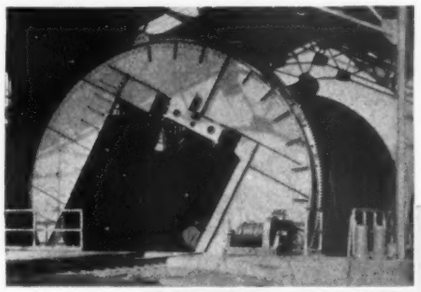
Pittsburgh—Users of new billet steel bars through last week found the market firm at 2.05c, base, Pittsburgh, for carload quantities of cut lengths. Likewise, rail steel bars are 1.95c, Pittsburgh. Demand is made up of a large number of small orders. Owing to government specification, rail steel for reinforcing purposes in a number of federal jobs at present is receiving the call over new billet bars.

Chicago—The largest of bar orders is 900 tons for a plant building for Armour & Co. here. Closing on this work removes most of the larger lots pending recently for private construction, but a fair volume of work is in prospect for public projects. For the Chicago sanitary district about 500 tons of bars are to be placed shortly, while 600 tons for the Waukegan sewage disposal plant remain pending. Additional orders for Illinois road work are in prospect, with requirements for the federal work relief program helping the outlook for summer months.

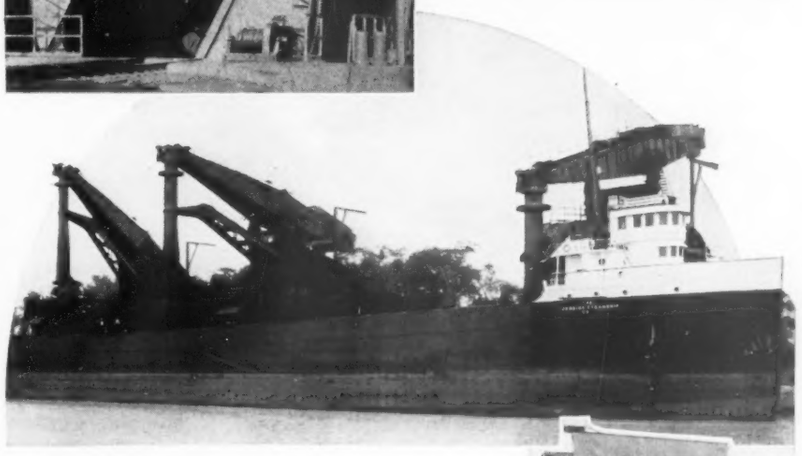
Boston—Early closing on a substantial volume of reinforcing steel for the Quabbin dam reservoir caisson

Concrete Awards Compared

	Tons
Week ended June 1	**4,981**
Week ended May 25	**5,422**
Week ended May 18	**2,257**
This week in 1934	**2,150**
Weekly average, 1934	**4,084**
Weekly average, 1935	**4,984**
Weekly average, May	**3,837**
Total to date, 1934	**109,766**
Total to date, 1935	**109,658**



UNLOADING EQUIPMENT



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core wall, Enfield, Mass., is expected. Most buying is limited to small lots which are fairly numerous. New inquiry is light. General contractors are holding up some volume with a hope of securing lower prices.

San Francisco—Awards were the fifth largest for any week so far this year and aggregated 3996 tons, bringing the total to date to 59,536 tons, compared with 48,491 tons for the corresponding period in 1934. The principal award was 3033 tons for the Southern Pacific-Key System track crossing, Oakland, Calif., to Pacific Coast Steel Corp.

Seattle—While considerable new building is projected, definite calls for reinforcing material are lacking and business is slow. Prices continue steady.

Reinforcing Steel Awards

3033 tons, Southern Pacific-Key System crossing, Oakland, Calif., to Pacific Coast Steel Corp., San Francisco.

900 tons, plant building, Armour & Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago, through Patrick Warren Construction Co., Chicago.

353 tons, bridge over Tujunga wash for Los Angeles county, California, to unnamed interest.

317 tons, Fourteenth street wharf, Oakland, Calif., to Soule Steel Co., San Francisco.

148 tons, including 62 tons of shapes, bureau of roads and bridges, Selway, Idaho, to unstated interests.

125 tons, Max Factor building, Los Angeles, to unnamed interest.

100 tons, approach to Park street bridge, Oakland, Calif., to unnamed interest.

Reinforcing Steel Pending

850 tons, Peck avenue sewer, Queens, N. Y.; Thomasetti Contracting Co., low.

285 tons, Folger avenue subway, Berkeley, Calif.; Ariss Knapp low on general contract.

275 tons, Del Balle avenue bridge, Los Angeles county, California; bids soon.

125 tons, Copper basin siphon, Los Angeles; bids June 29.

130 tons, including 45 tons of shapes, state railroad undercrossing, La Grande, Oreg.; bids in.

100 tons, 373-foot state span, Wenatchee, Wash.; bids in.

Unstated, estimated at several thousand tons, bars and piling, remaining 18 projects in Muskingum, O., conservancy district; bids to United States engineers, Zanesville, O., June 7 to 18.

Tin Plate

Tin Plate Prices, Page 64

Pittsburgh—A fractional gain to better than 75 per cent is noted in the average of operations among tin plate producers. Incoming specifications appear to be slightly ahead of the rate of operations, causing a reduction in mill warehouse stocks. Tin plate is steady at $5.25 base, Pittsburgh; tin mill sizes of black sheets 2.75c, base. No. 24 unassorted long ternes are firm at 3.40c, Pittsburgh.

Wire

Wire Prices, Page 65

Pittsburgh—Prices on wire products remained firm last week. Buyers are not canceling, nor suspending shipment and total volume is sufficient to engage local mills at around 40 per cent.

Cleveland — Orders for manufacturers' wire were fewer and in smaller tonnages during the week, as consumers withheld specifications, awaiting clarification of the markets. Demand for wire fencing continued strong.

Chicago—Decrease is developing in wire demand, with orders from users of manufacturers' wire lighter than a month ago. The automotive industry is curtailing requirements and consumption elsewhere also shows no improvement. Producers continue to quote 2.35c, Chicago, for plain wire, indicating no change in selling policies as a result of the ending of the steel code.

Boston—While consumers of manufacturers' wire and specialties are uncertain as to prices, buying has not declined materially, although some producers expect a more pronounced drop in new business this week. Heavier wire products continue to lag, with utilities buying cautiously. With stocks low, most consumers ask for quick deliveries.

Semifinished

Semifinished Prices, Page 65

Practically no interruptions have appeared in demand for semifinished steel, despite the Supreme Court's decision affecting the steel code. What course semifinished steel prices take is still a matter of conjecture. Some interests comment on the possibility of an advance.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 65

Bolt, nut and rivet demand continues slow, though business during May showed little change from that of April. Some decrease has been noted in requirements of miscellaneous consumers, while needs of railroads for track work have increased moderately. Farm implement manufacturers at Chicago are taking ma-

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terial in fairly steady volume despite a small decrease in schedule on some lines.

Automotive requirements have not regained momentum since the Chevrolet and Fisher body strikes. At some of these plants in southern Ohio strikes are still in force. Demand from jobbers has picked up at Cleveland. Prices are unchanged.

Pig Iron

Pig Iron Prices, Page 66

Pittsburgh—District furnace base prices on pig iron were holding firm and unchanged through last week on the following bases: Foundry grades, $18.50 per ton; basic, $18, and bessemer, $19. Carload requirements, at the most, constitute melters' pig iron commitments in this district. Only one merchant furnace is in blast here, Davison Coke & Iron Co.'s Neville Island, Pa., stack.

Cleveland — Pig iron shipments from lake furnaces in May were about equal to those in April, but producers expect less tonnage this month. Automobile foundries apparently have passed the peak. Specifications from these and other melters have declined, and new buying is in light volume. Sellers opened their books Saturday for the third quarter, but little contracting is anticipated pending clarification of the markets in the light of the Supreme Court's decision on the NRA. In the meantime producers are going ahead completing second quarter contracts, written under code regulations, which terminate June 30. Prices are steady.

Chicago—Producers have no intentions of changing recent prices and consumers generally are not pressing for revisions. The market continues $18.50, furnace, for No. 2 foundry and malleable. May shipments were practically unchanged from April despite a decrease in average foundry operations. The outlook for June is moderately favorable, though a curtailment in needs of automotive foundries, coupled with a decrease in schedules of some miscellaneous plants, is expected to result in smaller deliveries.

Boston—With several hundred tons of Russian pig iron, including high silicon and well balanced stocks, at both Providence, R. I., and Bridgeport, Conn., selling at a $1 and more under recent code prices, the market is further influenced by the arrival of 2518 tons of Dutch iron at Boston. These factors, combined with the voiding of the code, have resulted in great confusion. Foreign irons, with the exception of Indian, have been selling steadily under code prices and with the removal of the code, some domestic sellers are likely to meet this competition. Meanwhile buying is light and consumers look for lower prices.

New York—While pig iron tonnage dipped last week as the result of the confusion which followed the Supreme Court decision voiding NRA, there were sufficient immediate requirements to cushion the decline considerably. Sellers are holding prices unchanged and for the time being at least relative steadiness is expected.

Philadelphia—Pig iron prices are steady, with business temporarily at a standstill.

Buffalo—Pig iron demand was slack during the holiday period and shipments also declined during the week. Opening of books for the third quarter has created no special interest. Local furnaces have not accumulated excessive stocks during the recent period of the highest production in several years and will continue all stacks in blast for several months longer.

Cincinnati—Pig iron shipments during the past month were 15 to 20 per cent under peak levels of the first quarter but compared favorably with April commitments. Sales tend to dullness, and in small lots only, as melters reduced inventories. Quotations are steady.

St. Louis—Despite moderate recession in the melt as a whole, shipments of pig iron are holding up well, and preliminary reports indicate that the May total will show only slight decrease from the preceding month. A number of important melters here see no logical reason for augmenting inventories at this time. Present prices have been reaffirmed for third quarter, and no change is likely, regardless of the change in the code status.

Birmingham, Ala.—Output of pig iron, all classes, is steady, although schedules call for a decrease during the next few days.

Toronto, Ont. — New business again is developing in better volume in the pig iron market and local blast furnace representatives state sales are increasing. Sales are holding to lots ranging from 50 to 100 tons and melters are not taking in large stocks for future delivery.

Ferroalloys

Ferroalloy Prices, Page 66

New York—Ferromanganese shipments are smaller, reflecting the

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slight recession in steelmaking operations. Sellers generally look for this trend to continue probably into midsummer. Prices meanwhile, are unchanged at $85, duty paid, Atlantic and Gulf ports, at which level, they were recently reaffirmed for third quarter. Domestic spiegeleisen, 19 to 21 per cent, also is moving slowly, with prices steady at $26, Palmerton, Pa., on quantities up to 50 tons and $24 on 50 tons and over.

Scrap

Scrap Prices, Page 69

Pittsburgh—Owing to a cautious attitude by leading scrap users, the market has quieted somewhat the past week with prices considered firm at unchanged levels. The only price change of the week has been an advance of 50 cents a ton in blast furnace scrap, now quoted $6.50 to $7 on purchases by a down-river mill. A down-river mill, which has bought over 30,000 tons of scrap within the past few weeks, has been paying as high as $13.25 for compressed sheet scrap. Owing to increasing supplies of heavy breakable cast, this grade shows softening tendencies.

Cleveland — Inactivity prevails in the steel and iron scrap market, with sellers and melters alike awaiting developments, with price nominal. Shipments on contracts are going forward steadily. Offerings are small, railroads listing less than usual.

Chicago—Scrap is marking time, with only minor changes in prices. New business in heavy melting steel is absent following a small sale of No. 1 heavy melting steel nearly two weeks ago at $10.50. Brokers continue to pay close to $10.50 in covering contracts, with offerings still limited.

Boston—Scrap buying for export continues active at unchanged prices for heavy melting steel grades, $8.50 and $7.50, dock. These prices have been bettered on substantial tonnages of rails. Material is being bought for shipment from Boston and Providence, R. I., and a boat is expected to load at Portland, Me., shortly. Turnings continue to display strength, $2.25, f.o.b. being paid for Pittsburgh shipment while close to $4, dock, is reported paid for export.

New York—Domestic buying of scrap is light, although eastern mills are taking some small irregular shipments, including Bridgeport, Conn. Most activity is centered on buying for export, dealers paying unchanged prices. Heavy melting steel grades are not coming out freely. Prices are steady, nominal in some instances without a test.

Philadelphia—Prices of steel and iron scrap are generally unchanged, with sentiment mixed. Some observers expect an easier trend and point to the disposition of some collectors to accept less for their material. However, this tendency is not general and there is not sufficient consuming demand to afford a test.

Buffalo—Dealers claim to have sold No. 2 heavy melting steel locally at $10 for delivery to Buffalo consumers. This is top price paid for this material this quarter and means No. 1 heavy melting steel would be worth $11.50 on the same basis. It is said several thousand tons have been contracted for at this price although dealers still have considerable material to deliver on $9 and $9.50 contracts for No. 2 heavy melting steel, hydraulic compressed sheets and No. 1 busheling. A sharp spurt in malleable prices is reported this week also advances on other materials are recorded. More scrap is arriving by water and may tend to defer purchases from local dealers.

Detroit—Pending a clearer view on the market situation resulting from the destruction of NRA, iron and steel scrap dealers are sitting tight. The general opinion is that the ultimate effect will be to accelerate recovery and make for a much better last half year in the consumption of scrap than had been expected. Offerings by automobile manufacturers are tapering off as most plants pass the peak of their run on current models. Water shipments are moving slowly. Prices are unchanged on the basis of $8 to $8.50 for heavy melting steel, and $8.50 to $9 for hydraulic compressed sheets.

Cincinnati—Dealers in iron and steel scrap are marking time. Anticipated tonnage mill purchases have failed of fulfillment, and speculative buying by brokers has been temporarily halted.

St. Louis—Mills are strenuously resisting higher scrap prices, and purchasing generally is almost nil, but the trend of prices continues upward, with specific advances recorded on several grades.

Birmingham, Ala.—While better feeling in scrap iron and steel developed recently there has been no tangible demonstration that the market is improved. Melters are buying in limited quantities.

Seattle — The market shows little change. Japan still is overstocked and importers are refusing to quote. Prices are weak with exporters quoting $9.50 for No. 1 melting and $10.50 for rails with no takers.

Toronto, Ont.—Trading in iron and steel scrap is below the average for the past couple of months, owing to

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reduced operations at the Steel Co. of Canada, Hamilton, Ont., where the sheet mill has been closed on account of a strike. Scrap shipments to the Hamilton district have fallen off and local dealers report little demand for heavy melting steel at the moment. Montreal dealers, however, state that fair demand exists for steel grades. Demand for iron scrap is steady, with a few special grades furnishing the most new business.

Warehouse

Warehouse Prices, Page 70

Pittsburgh—Few jobbers are increasing stocks but not in expectation that mills will reduce prices. In fact, mill supply houses here are considering an advance in carbon steel bars from the present 2.25c most are quoting.

Cleveland — Warehouse tonnage was lighter in May than in April. The number of orders received by some sellers also declined. Strikes continue to be a retarding factor in this district.

Chicago — Sales were well maintained during May, the recession from April being slight and less than usually is experienced. Prices are unchanged.

Boston—Volume with most jobbers district during May held to about the previous month's totals. Warehouses in textile machinery districts feel the dullness in that industry. Lower import duties on several steel products imported from Sweden is expected to increase such shipments.

Philadelphia—A decline in demand for steel from warehouse is evident and some sellers made a poorer showing in May than in April.

Detroit—Demand for iron and steel out of store is ebbing slowly, although seasonally high. Tool and die makers are figuring on much work but have not yet made sizable purchases. Prices generally are steady.

Cincinnati—Warehouse trade in May was close to April levels. Prices were reaffirmed for June, and it is too early to determine how stable these are under altered conditions. Demand for building materials has not been well sustained.

St. Louis—Business at iron and steel warehouses is holding its own, despite continued unfavorable weather, scattered strikes and uncertainties involved in the NRA situation. In the immediate past there has been an improved demand for wire and wire products, particularly fencing material.

Seattle — Volume of warehouse sales has fallen off. Public works demand is furnishing some business and the agricultural sections are buying in fair volume.

Iron Ore

Iron Ore Prices, Page 69

Cleveland—Lake Superior iron ore producers believe the last half will determine the real volume this year. At present there are so many uncertainties, growing out of the labor and political ferment, that it is difficult to make plans very far ahead.

Although the miners continued at work, despite efforts of organizers to induce them to strike, a government mediator was reported seeking interviews with the mining companies.

Although the shipping season started well, with 400,000 tons in April, last month did not show a corresponding increase. The shipments to May 25 indicated a total of about 3,000,000 tons for the month compared to 2,630,000 tons in the month last year. Even with a possible 5,000,000 tons in June, the first half will show only 8,400,000 tons, considerably less than one-third of the amount expected for the eight active shipping months in the year.

The number of vessels in commission in the ore trade May 15 was 120, or 19 less than on May 15, 1934. The number of carriers in commission May 15 was 152, compared with 188 last year. Hence, a larger proportion of those in commission are engaged in the ore trade. The Pittsburgh Steamship Co., United States Steel Corp., had 42 of its 86 boats in commission May 15; Interlake Steamship Co., Pickands, Mather & Co., subsidiary, 23 of its 49.

Practically no iron ore sales have been made in the open market since the Ford Motor Co. closed for its season's requirements.

Metallurgical Coke

Coke Prices, Page 65

Abolishment of the effectiveness of NRA codes confirms a situation in the coal and coke markets of several months' standing. For more than a month, code violations have been reported. As yet it is too early to determine what the beehive coke industry's price policy will be. The nominal price schedule on standard furnace coke remains around $3.60, Connellsville, Pa., ovens, and common foundry coke is quoted $4.60, and premium grades, $5.10 to $5.35 per ton.

Foundry coke shipments at Chicago in May were slightly heavier than in April. Domestic coke deliveries in May were heavy, providing stocks for dealers before the usual advance June 1. Cincinnati consumers of coke took better tonnage in May than April, with prices steady. At St. Louis May brought a lower total of shipments than in April. Producers at Birmingham, Ala., continue production although there is some accumulation.

Steel in Europe

Foreign Steel Prices, Page 70

London—(*By Radio*) — Domestic consumption of pig iron in Great Britain is expanding, and as stocks are small an increase in production is indicated. The market for hematite is active. Structural and heavy engineering shops are busy. The domestic sheet market is satisfactory, but exports are small. Tin plate and galvanized sheets are quiet.

The Continent reports export trade dull, although China and Scandinavia are showing some interest. Germany is booking some business from South America and Japan.

Coke By-Products

Coke By-Product Prices, Page 65

New York—Several coke oven byproducts are less active. Included are napthalene, sulphate of ammonia and to a lesser degree phenol, industrial demand for the latter not having revived fully from the decline of some weeks ago. Buying of distillates, however, continues active. Prices are unchanged.

Quicksilver

New York—Small lot quicksilver prices are easy in a quiet market. Lots of about 15 to 25 flasks are available at $73 a flask against $73.50 previously. Round lots of 100 flasks or more are unchanged at $72 a flask.

Nonferrous Metals

Nonferrous Metal Prices, Page 66

New York — Nonferrous metals maintained price steadiness last week despite confusion and uncertainty developed after the Supreme Court's nullification of NRA. Leaders in the industry immediately adopted a policy of watchful waiting for indications of new moves in Washington. Members of the copper industry decided "to take no action involving any change in the status or procedure under which the industry has been operating pending clarification of the situation."

Copper—Sales held up well with the total allocated through Thursday

24,983 tons. Producers held prices firm at 9.00c, Connecticut, but metal was available in the outside market as low as 8.50c. Export metal was easier with prices reported down to 8.15c, c.i.f.

Lead—Demand was actve during the early part of the week and prices advanced $2 a ton Monday. Business was not well distributed, however, and American Smelting lowered its quotation $2 a ton Friday to 4.10c, East St. Louis, and 4.25c, New York. St. Joseph Lead continued to quote 4.20c, East St. Louis, and 4.40c, New York.

Zinc—Prime western maintained a firm price tone at 4.30c, East St. Louis. Sales for the week ended May 25 totaled 7100 tons.

Tin—Demand was dull and prices headed downward on exchange fluctuations.

Antimony—Sales were negligible but prices held unchanged.

Aluminum — Remelt aluminum quotations were stepped up early in the week but virgin aluminum held unchanged.

Production

SUSPENSION of steelmaking capacity in the Pittsburgh, Chicago, Wheeling and Youngstown districts over Memorial day and in some cases for the remainder of the week, pulled the national steel rate down 1½ points to 42½ per cent, lowest point since the first week of January. This loss, however, will probably be recouped this week when the mills again resume. Details follow:

Central eastern seaboard — Unchanged at 29½ per cent last week despite sharp letdown in current buying, resulting from NRA decision, and in a minor degree from the holiday. Some finishing departments suspended operations last Wednesday night for the remainder of the week.

Cleveland-Lorain — Unchanged at 54 per cent, Corrigan, McKinney Steel Co. continuing with seven open hearths, Otis Steel Co. four, and National Tube Co., Lorain, ten. Steel ingots were produced on Memorial day in this district. Cleveland sheet mills were down 10 points to 40 per cent for the week. Newton Steel Co.'s Monroe, Mich., sheet mills, resumed after two weeks idleness following a strike.

Youngstown—Dipped 2 points to 48 per cent, but is expected to rebound to 51 per cent at this week's start, when Youngstown Sheet & Tube Co. resumes melting in four open hearths.

Chicago—Declined 1 point to 43 per cent, a new low mark for the year to date. Blast furnace schedules are unchanged with 14 of 36 steelworks stacks active.

Wheeling — Off 6 points to 62 per cent last week, with 23 out of 37 open-hearth furnaces active.

Pittsburgh — Off 3 points to 35 per cent through last week because of general observance of the holiday. Some open-hearth departments did not reopen for May 31 and June 1 operations. However, the chief adverse factor of the week was the decline in operations to the 30-31 per cent mark by the leading local interest. Rates of the independent producers are still strongly sustained at around the 40 per cent mark.

Two less steelworks blast furnaces are on here this week, as National Tube and Jones & Laughlin each banked one furnace, making 21 out of 60 furnaces on.

New England — Up 3 points to 63 per cent last week, with this rate likely to hold this week. Ingot producing operations are above finishing mill schedules in most instances with at least two steelworks building up raw steel stocks.

Birmingham — Twelve open hearths continued in operation, maintaining the rate at 54½ per cent. Rail orders were at the end of the run, but an order for 7500 tons from the Texas & Pacific railroad will bring about steady operation of the Ensley Works for another week or ten days. When rail orders have been completed the rate is expected to drop to 33½ per cent.

Buffalo — Unchanged at 37 per cent, with 14 open hearths still in operation.

Detroit—Held at 94 per cent last week, 16 open hearths continuing active.

Steelmaking Operations

Percentage of Open Hearth Ingot Capacity Engaged in 10 Leading Districts

	Week ended June 1	Change	Same week 1934	Same week 1933
Pittsburgh	36	— 2	50	30
Chicago	43	— 1	65	38
Eastern Pa.	29½	None	45½	24½
Youngstown	48	— 2	63	52
Wheeling	62	— 6	74	80
Cleveland	54	None	79	64
Buffalo	37	None	53	33
Birmingham	54½	None	55	50
New England	63	+ 3	84	59
Detroit	94	None	100	38
	42½	— 1½	60	47

SHEET STATISTICS OFF

Daily average sheet steel sales, production and shipments reported by the National Association of Flat Rolled Steel Manufacturers, Pittsburgh, were lower in April than in March. Sales declined from 6228 net tons in March to 5603 tons; production from 7325 tons to 6974 tons, and shipments from 7530 tons to 6745 tons. January was the highest month this year in average sales; February highest in production, and March led in shipments. Totals for April: Sales, 168,093 tons; production, 209,219 tons; shipments, 202,365 tons. Total sheet capacity in the United States for April was 550,000 net tons, and the capacity for which the association reports was 307,000 tons.

CANADIAN STEEL, FERROALLOY OUTPUT UP, PIG IRON DOWN

Production of steel ingots and direct steel castings in Canada in April rose to 68,530 tons, from 57,840 tons in March, but was about 3 per cent below the 70,363 tons recorded for

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It will handle 20 tons or more per day and will bend bars 1¼ in size. Several bars can be bent in one operation depending on the size of bars. Circles or radius of any size required in reinforcing work from 18" up can be bent. Bars with different radius can be bent in one operation without stopping machine.

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April last year. Total for the first four months was 241,902 tons, compared with 262,072 tons in the same period last year.

Pig iron production in April totaled 43,388 tons, a slight decline from the March figure of 44,727 tons, but was a 59 per cent increase over the 27,355 tons in April last year. For the four months ending with April, total output of pig iron was 169,790 tons, compared with 82,332 tons in the same period last year.

Output of ferroalloys in April was 5147 tons, compared with 2715 tons in March, and 2162 tons in April, 1934. Four-month total of ferroalloys was 13,369 tons, against 7009 tons in the first four months of last year.

Activities of Steel Users and Makers

(*Concluded from Page* 22)

dustrial electrochemical instruments or flowmeters for sale in the United States or Canada unless through Leeds & Northrup and the latter will not offer its similar instruments for sale in the British Empire, except Canada, unless through Kent. Sale in the United States by Builders Iron Foundry of Kent venturi and shunt-type rotary meters or sale anywhere by either company or its agents of products other than those mentioned is not in any way affected.

◆ ◆ ◆

Max Solomon Co., Oliver building, Pittsburgh, has commenced wrecking the plant of National Radiator Co., North Tonawanda, N. Y.

◆ ◆ ◆

Theodore L. Dodd & Co., 80 East Jackson boulevard, Chicago, has been appointed sales representative for the Middle West by Dall Mfg. Co. Inc., Cleveland, manufacturer of pistons.

◆ ◆ ◆

Republic Steel Corp., Youngstown, O., has moved its offices at Buffalo from 475 Abbott road to 1020 Liberty Bank building. Thomas B. Davies continues in charge as district sales manager, with his present staff.

* * *

J. Harvey Bryan, New York, will move his offices from 1372 to 1962, 50 Church street. He is district sales representative for the Apollo Steel Co., Apollo, Pa.; Bliss & Laughlin Inc., Buffalo; Gulf States Steel Co., Birmingham, Ala.; Thomas Steel Co., Warren, O.; and Page-Hersey Tubes Ltd., Toronto, Canada.

◆ ◆ ◆

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has appointed the Hollup Corp., 3357 West Forty-seventh street, Chicago, exclusive distributor of its welding equipment, except in the back bay region of the San Francisco district, for railway service. The Hollup Corp. has distribution points in practically every important city of North America.

◆ ◆ ◆

Pioneer Engineering & Mfg. Co., Detroit, has moved from 8316 Woodward avenue to larger quarters at 31 Melbourne avenue and has increased its engineering force to 70 members. The company designs tools, gages, dies and special machinery and manufactures rollway coolant and lubricant pumps and centrifugal and hydraulic pumps.

◆ ◆ ◆

Republic Steel Corp., Youngstown, O., effective May 1st, will move its Philadelphia sales office, including those of its subsidiaries, Berger Mfg. Co. and Union Drawn Steel Co., from the Fidelity-Philadelphia Trust building to the Broad Street Station building, 1617 Pennsylvania boulevard. J. B. DeWolf remains in charge as district sales manager, with his present staff.

Capacity Table Offered

The valuable table printed in STEEL for March 18, pages 24 and 25, breaking down the capacity for making leading steel products by cities, has been enlarged to 17 x 20 inches suitable for framing or under glass desk tops. Single copies, mailed rolled, are 30 cents, postpaid, from the readers' service department, STEEL, 1213 West Third street, Cleveland.

Corp. Broadens Life Insurance

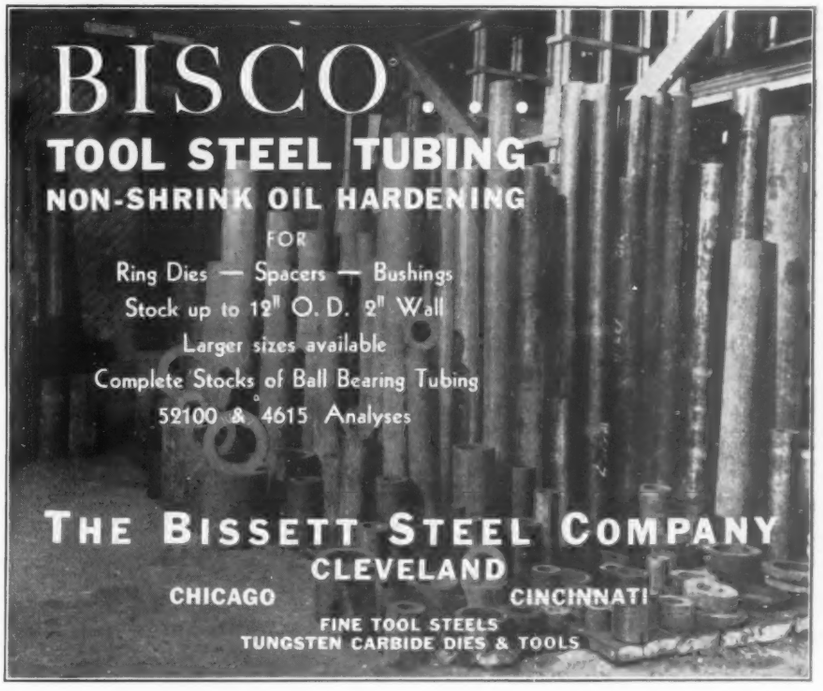
EMPLOYES of the United States Steel Corp., numbering approximately 200,000 are being offered group life insurance, cost of which is to be borne jointly by the Corporation and employes.

Under the new plan, approved at the recent annual meeting of stockholders, the Corporation will pay all premiums amounting to more than 75 cents per month per $1000 of insurance. According to unofficial estimates, total insurance may amount to more than $350,000,000.

The proposed plan should offer employes substantial savings under the system now in operation, for not only does the Corporation share the expense, which it has not been doing in the past, but the new plan also is an over-all group plan, which should combine the purchasing power of employes with resultant more favorable terms. Under the present system, various groups within the Corporation have operated plans of their own with no relationship whatsoever to each other.

The new plan has been under contemplation by the Corporation management for several years and should be affected in no way by the proposed federal security legislation which deals principally with unemployment and old age pensions. This Corporation program, it may be emphasized, deals solely with group life insurance.

The expectation is that the proposed group plan, being cheaper, will



supersede most of the various group plans now operative among employes of the Corporation, although not necessarily all. Incidentally, the new plan does not include pensioners, whereas some of those now in effect do.

Equipment

Boston — Several machine builders in Connecticut have booked some fair orders, including shops at New Britain and Bridgeport. The automobile industry, which has bought little recently, is beginning to display more interest. Chevrolet has bought some equipment in New England, five tools from one shop, including two automatic screw machines. Most of the business resulting from automotive activity has been with makers of accessories. Recent surveys by engineering executives of several plants indicate a large potential volume prevails for the replacement of obsolete machinery, and such business will come out with a moderate return of confidence or even a fairly substantial upturn in industrial activity.

Chicago — Machinery and equipment demand is spotty, with the trend fairly steady. Machine tool business is quiet, sales usually involving single items while inquiries include few large lists. A few makers of special metalworking equipment report brisk activity, but demand for such products is confined to one or two industries. Business in foundry equipment continues better than a year ago. Effect of the NRA decision on machinery markets is seen as likely to be favorable since lack of confidence in government policies frequently has been indicated as responsible for the postponement of capital expenditures. Steel plants here are doing only miscellaneous repair work in addition to rolling mill building programs already under way. Major improvements and extensions to steelmaking departments are deferred. Cranes for the new plant of American Sheet & Tin Plate Co. have been placed with Harnischfeger Corp., Milwaukee.

New York—Fair inquiry prevails for machine tools, although orders show little change. Purchasing is well distributed among widely spread industrial plants, but generally limited to one or two tools at a time. Of 15 tools to be bought for Philadelphia, closing June 4, the inquiry calls for 12 milling machines, two cylindrical grinders and one precision lathe.

Seattle — Demand is increasing as public works progress and mining activities continue. Much equipment and machinery are being shipped to Alaska where gold operations will be enlarged. Cramer Machinery Co., Portland, announces it has booked orders for two complete concrete mixing plants with the general contractors at Grand Coulee dam. The contract totals $225,000.

Construction and Enterprise

Michigan

BAY CITY, MICH.—Laetz Foundry Co., 800 Woodside avenue, has been organized to engage in general foundry business, by Mary F. Cooley, Bay City, Mich.

CROSWELL, MICH.—Michigan Sugar Co., Second National Bank building Saginaw, Mich., plans modernizing and constructing alterations to beet sugar refinery, at a cost of over $30,000. This is in addition to other units and is part of the $50,000 rehabilitation program.

DETROIT—Austin Co., 2-243 General Motors building, has been awarded contract for $10,000 addition to the plant of the Forge & Casting Co., 1101 Wan. Ferndale street.

MARQUETTE, MICH. — Cliffs-Dow Chemical Co. has been organized manufacture chemicals derived f wood, by the Dow-Chemical Co., Midland, Mich., and the Cleveland-Cliffs Iron Co., Cleveland. Arrangements have been made to dispose of shares to provide money for further expansion and development. (See p. 22.)

Ohio

CINCINNATI—Hamilton Co. is preparing plans for sewage disposal plant, costing $500,000. J. S. Raffety, county sanitary engineer.

CINCINNATI—City, waterworks department, reports plans are completed for waterworks improvements, including new lines and hydroelectric equipment. Entire project will cost $3,000,000.

ZANESVILLE, O.—United States engineer will take bids June 14 for traveling cranes, trolleys and hoists, for the Piedmont, Mohicansville, Leesville, Bolivar, Pleasant Hill and Atwood dams.

Illinois

CHICAGO — General Construction Equipment Corp., 33 South Clark street, has been incorporated by Judith Rose, Benjamin Jordan and Florence R. Kollock, to deal in all kinds of machines, machinery, apparatus and devices. Correspondent: Gilbert G. Wolfe, 1346 First National Bank building.

HILLSBORO, ILL.—Petitions are being circulated here asking the city council to call a special election to vote on a proposition to sell revenue bonds for $180,000 to construct a city electric power light and gas plant, to replace present service of Illinois Power & Light Corp.

MARISSA, ILL.—Village received no bids May 8 for constructing waterworks and distribution system, and will readvertise. PWA loan of $123,000 has been allotted.

ROCK ISLAND, ILL.—United States engineer office, Clock Tower building

(*Please turn to Page* 86)

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Air Reduction Sales Co., 60 East 42nd St., New York City.
inde Air Products Co., 30 E. 42nd St., New York City.

ACID-PROOF LININGS
Ceilcote Co., The, Rockefeller Bldg., Cleveland, O.

CIDS (Pickling)
merican Chemical Paint Co., Ambler, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

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The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

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Bethlehem Steel Co., Bethlehem, Pa.
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Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Standard Steel Works Co., Burnham, Pa.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

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Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.

BAR BENDERS
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.

BARGES (Steel)
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
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McClintic-Marshall Corp., Bethlehem, Pa.

BARRELS (Plating)
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

BARRELS (Steel)
Pressed Steel Tank Co., Milwaukee, Wis.

BARS (Alloy)
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Midvale Co., The, Nicetown, Philadelphia, Pa.
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Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
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Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
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Youngstown Sheet & Tube Co., Youngstown, O.

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Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
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S K F Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa.

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Shenango-Penn Mold Co., Dover, O.

BEARINGS (Journal)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
S K F Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Quill)
Bantam Ball Bearing Co., South Bend, Ind.

BEARINGS (Radial)
Bantam Ball Bearing Co., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
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SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Roller)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
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Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Roll Neck)
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BEARINGS (Rolling Mill)
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Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
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SKF Industries, Inc. Front St. & Erie Ave., Philadelphia, Pa.
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Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.

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will take bids June 21 on traveling tainter gate hoists.

Indiana

JEFFERSONVILLE, IND. — Howard Ship Yards & Dock Co. plant was recently damaged by a severe storm.

WHITING, IND.—McKenna Valve Tool Corp., 1101 Indianapolis avenue, has been formed to manufacture tools, dies and automobile accessories, by William G. Kovacsy, Barney McKenna, C. R. Davis and M. G. Sprout, the latter being named resident agent.

New York

BUFFALO—Magnus Beck Brewing Co., 461 North Division street, plans purchasing and installing eight 450-barrel steel storage tanks.

MASPETH, N. Y.—National Can Co., Grand street, plans erecting a 2-story, 180 x 261-foot, plant here, costing about $260,000.

NIAGARA FALLS, N. Y. — City will take bids late this month or early in July for constructing heating plant at municipal waterworks. Cost is estimated at $50,000. H. Wesley Clark, city engineer.

Pennsylvania

BRADFORD, PA. — Northeastern Container Corp., recently organized, plans installation of electric power equipment in new local corrugated container manufacturing plant. Company has acquired former factory of Hanley Machine Co. and will remodel and equip it. Entire project will cost about $70,000.

DUBOISTOWN, PA. — Borough is making plans for complete sanitary sewage system. Council committee, headed by R. Brown, is in charge.

ERIE, PA.—Construction of a large bulk distributing plant for the Sun Oil Co. 1608 Walnut street, Philadelphia, is to begin at once.

JOSEPHTOWN, PA.—St. Joseph Lead Co. expects to build additional dock facilities on the left bank of the Ohio river here.

PITCAIRN, PA.—Machine shop of the Pennsylvania railroad was damaged by fire May 26.

New Jersey

SAYREVILLE, N. J.—Mayor and city council plan constructing sewage disposal plant, costing $125,000. PWA funds will be applied for. L. P. Booz, Perth Amboy, N. J., engineer.

Connecticut

WATERBURY, CONN. — Wallingford Steel Co. plans to erect an addition to its plant, at a cost of $100,000, including equipment.

WESTPORT, CONN.—Gault Bros., Riverside avenue, plan installing three 50,000-gallon steel storage tanks. Private plans.

Rhode Island

EXETER, R. I.—State department of public welfare, State house, Providence, R. I., plans extension and betterments in power station at State school, with installation of new boilers, automatic stokers and accessories. Cost about $25,000.

Kentucky

FISHERVILLE, KY.—Coffey Distilling Co. has plans prepared by Walter C. Wagner, Breslin building, Louisville, Ky., for distillery, consisting of main unit, fermenting building, power house, storage and distributing building. Cost is estimated at $80,000.

Maryland

BALTIMORE — James Distillery Inc., 807 Key Highway, is erecting a 2-story addition to its plant. Barry F. Cullison, 825 Powers street, is general contractor.

District of Columbia

WASHINGTON—Chief, bureau of ordnance, navy department, will take bids June 10, advertisement 171, for 27 8-inch liner forgings.

Georgia

ATLANTA, GA.—Atlanta Ice & Bottling Co., 247 Courtland street, northeast, plans remodeling building, and will install brewery machinery, at a cost of $75,000.

SAVANNAH, GA.—Coca-Cola Corp., 534 East Bryan avenue, will expend $40,000 for improvements to plant, including mechanical bottling and other equipment.

Mississippi

HATTIESBURG, MISS.—Chancellor Lumber Co., L. V. McNeal secretary, is erecting an addition to its lumber plant, including a 23 x 80 foot dry kiln, a 30 x 120-foot saw mill, and a 30 x 100-foot planer mill.

Florida

DUNEDIN, FLA.—Powell Crosby Jr. has acquired 200 acres of land for constructing a packing and bottling plant.

North Carolina

FAYETTEVILLE, N. C.—Public works commission, H. J. McBuie secretary, will receive bids June 5 for furnishing materials, equipment, apparatus and labor for improvements and alterations to city's distribution system.

Tennessee

JACKSON, TENN.—West Tennessee Power & Light Co. plants to spend $20,000 for improvements to distribution plant, and will install a steel outdoor switchboard, distribution feeder, etc.

MEMPHIS, TENN.—Standard Brake Shoe & Foundry Co., E. S. Dilley, president, Pine Bluff, Ark., and 422 Exchange building, Memphis, Tenn., will establish a branch plant here at a cost of $200,000, for making carbon and alloy steel castings, gray iron and alloy iron castings and brake shoes.

Virginia

DANVILLE, VA.—Harold L. Ickes, PWA administrator, Washington has allotted loan and grant of $2,750,000 for hydroelectric plant on Dan river near Pinnacles, 60 miles west of here, comprising two dams and power house with transmission line into Danville

NORFOLK, VA. — Virginia Distillery Co., Maj. E. H. Chase Jr., Orange, Va., is receiving bids for complete distillery equipment to be installed in a building on Billings street.

RICHMOND, VA.—Philip Morris & Co. Inc., Twentieth and Main streets, plans to install electric power equipment in new three-story addition to tobacco factory. Cost close to $100,000.

Missouri

CHAFEE, MO. — Elrod-Lankford Lumber Co. plans to rebuild its mill and storage building recently damaged by fire.

MEXICO, MO.—City has $88,000 available for erecting of sewage disposal plant. J. W. Shikles & Co., en-

(*Please turn to Page* 88)

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Timken Steel & Tube Co., Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

BLAST FURNACE SPECIALTIES
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh, Pa.

BLAST FURNACES—See FURNACES (Blast)

BLOWERS
Coppus Engineering Co., 359 Park Ave., Worcester, Mass.
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., Phillipsburg, N. J.
Strong, Carlisle & Hammond Co., The, 1400 W. 3rd St., Cleveland, O.

BOILER HEADS
Bethlehem Steel Co., Bethlehem, Pa.

BOILER TUBES—See TUBES (Boiler)

BOILERS
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Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Jones & Laughlin Steel Co., Jones & Laughlin Bldg., Pittsburgh, Pa.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh, Pa.
Republic Steel Corp., Upson Nut Div., 1912 Scranton Rd., Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

BORING MACHINES (Horizontal)
Landis Tool Co., Waynesboro, Pa.

BOXES (Annealing)
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh, Pa.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BOXES (Case Hardening)
Driver-Harris Co., Harrison, N. J.
Strong, Carlisle & Hammond Co., The, 1400 W. 3rd St., Cleveland, O.

BOXES (Open Hearth Charging)
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BRAKES (Electric)
Clark, The, Controller Co., 1146 E. 152nd St., Cleveland, O.

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McClintic-Marshall Corp., Bethlehem, Pa.
Ohio Structural Steel Co., The, Newton Falls, O.
Truscon Steel Co., Youngstown, O.

BRUSHES (Motor and Generator)
Ohio Carbon Co., The, 12508 Berea Rd., Cleveland, O.

BUCKETS (Clam Shell, Dragline, Grab, Single Line)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Blaw Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BUILDINGS (Steel)—See BRIDGES, ETC.

BULLDOZERS
Beatty Machine & Mfg. Co., Hammond, Ind.

BURNERS (Acetylene)—See TORCHES AND BURNERS

BURNERS (Automatic)
Surface Combustion Co., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Warren, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BURNERS (Fuel, Oil, Gas, Combination)
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Surface Combustion Co., 2375 Dorr St., Toledo, O.
Wean Engineering Co., Warren, O.
Wilson, Lee, Engineering Co., 1370 Blount St., Cleveland, O.

BUSHINGS (Bronze)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Gifford Engine Co., Lansing, Mich.
Shenango-Penn Mold Co., Dover, O.

BUSHINGS (Steel)
Danly Machine Specialties, Inc., 2147 So. 52nd St., Chicago, Ill.
Gifford Engine Co., Lansing, Mich.

BUSINESS CARDS (Engraved)
Modern Card Co., 1153 Fullerton Ave., Chicago, Ill.

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Koppers Construction Co., 1438 Koppers Bldg., Pittsburgh, Pa.

CADMIUM
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

CADMIUM PLATING PROCESS
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

CAR DUMPERS
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CASTERS
Lansing Co., Lansing, Mich.

CASTINGS (Acid Resisting)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
International Nickel Co., Inc., 67 Wall St., New York City.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Shenango-Penn Mold Co., Dover, O.

CASTINGS (Alloy Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Treadwell Engineering Co., Easton, Pa.
Union Steel Casting Co., 62nd & Butler Sts., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.

CASTINGS (Brass, Bronze, Copper, Aluminum)
Aluminum Industries, Inc., 2348 Beekman St., Cincinnati, O.
Bethlehem Steel Co., Bethlehem, Pa.
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Morgan Engineering Co., The, Alliance, O.
Shenango-Penn Mold Co., Dover, O.

CASTINGS (Electric Steel)
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

CASTINGS (Gray Iron, Alloy, or Semi-Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Erie Foundry Co., Erie, Pa.
Forest City Foundries Co., 2500 W. 27th St., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Murray Iron Works, Burlington, Iowa.
National Roll & Foundry Co., The, Avonmore, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Treadwell Engineering Co., Easton, Pa.

CASTINGS (Heat Resisting)
Driver-Harris Co., Harrison, N. J.

CASTINGS (Malleable)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Lake City Malleable Co., 5026 Lakeside Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Peoria Malleable Castings Co., Peoria, Ill.

CASTINGS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Mackintosh-Hemphill Co., 9th & Bingham Sts., Pittsburgh.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.
Pittsburgh Rolls Corp., 41st and Willow Sts., Pittsburgh, Pa.
Standard Steel Works Co., Burnham, Pa.
Strong Steel Foundry Co., 33 Norris Ave., Buffalo, N. Y.
Treadwell Engineering Co., Easton, Pa.
Union Steel Casting Co., 62nd & Butler Sts., Pittsburgh, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh, Pa.
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

CASTINGS (Worm & Gear Bronze)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

CEMENT (High Temperature)
Carborundum Co., The, Perth Amboy, N. J.
Norton Company, Worcester, Mass.
Strong, Carlisle & Hammond Co., The, 1400 W. 3rd St., Cleveland.

CHAIN (Draw Bench)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CHAIN (Malleable)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Lake City Malleable Co., 5026 Lakeside Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CHAIN (Sprocket)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Peoria Malleable Castings Co., Peoria, Ill.

CHAIN (Steel-Finished Roller)
Chain Belt Co., 1660 W. Bruce St., Milwaukee, Wis.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CHARGING MACHINES (Cupola)
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Morgan Engineering Co., The, Alliance, O.

CHARGING MACHINES (Open Hearth)
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

CHECKS (Metal)
Cunningham, M. E., Co., 107 E. Carson St., Pittsburgh, Pa.

CHISEL BLANKS
Pittsburgh Tool, Knife & Mfg. Co., 7501 Thomas Blvd., Pittsburgh, Pa.

CHROME ORE
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia.

CHROMIUM METAL
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

CLEANING SPECIALTIES
American Chemical Paint Co., Ambler, Pa.

CLUTCHES (Magnetic)
Magnetic Mfg. Co., Dept. TL, 650 So. 28th St., Milwaukee, Wis.

COAL AND COKE
Alan Wood Steel Co., Conshohocken, Pa.
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Hanna Furnace Corp., The, Detroit, Mich.
Interlake Iron Corp., Union Trust Bldg., Cleveland, O.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

COAL, ORE AND ASH HANDLING MACHINERY
Atlas Car & Mfg. Co., The, 1140 Ivanhoe Rd., Cleveland, O.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

COATINGS (Sprayed Metal)
Metallizing Co. of America, Inc., 1218 Long Beach Ave., Los Angeles, Calif.

COKE—See COAL AND COKE

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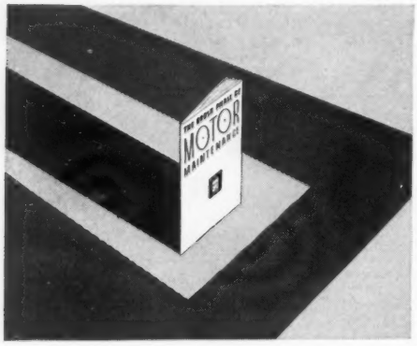

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—Construction and Enterprise—

(*Concluded from Page* 86)

gineer, 708 New York Life building, Kansas City, Mo.

PATTONSBURG, MO. — Common council has completed plans and will take bids for new municipal electric light and power plant, using diesel engine generator units. Cost about $65,000.

PERRY MO.—City rejected former bids and will call for new bids for filtration plant with equipment, including 75,000-gallon steel tank on tower, centrifugal pumps. Cost estimated at $59,000.

ST. LOUIS—Metalcraft Corp. has been organized with $25,000 capital, by Harvey E. Lyons and Wilbur B. Jones, 506 Olive street.

Arkansas

FORT SMITH, ARK.—Ozark Distillers Inc., A. S. Bullock secretary, Merchants National Bank building, will soon begin construction of a $100,000 distillery, including power house, machine shop, etc. (Noted May 13).

Oklahoma

SKIATOOK, OKLA.—City has voted $93,000 water line and pumping station bonds.

Texas

HEMPSTEAD, TEX.—City, S. C. Walker mayor, plans $80,000 waterworks and sewer improvements; will apply for loan and grant.

SAN ANTONIO, TEX.—Commanding officer, San Antonio Arsenal, will take bids June 10, circular 15, for one set of automotive tools and one hydraulic jack, 20,000-pound capacity.

Wisconsin

ANTIGO, WIS.—Kraft-Phenix Co. is remodeling power plant of local factory and installing 312-horsepower Vogt boiler served by a Firerite automatic stoking unit.

GREEN BAY, WIS.—International Harvester Co. has purchased 100 feet of frontage adjacent to its branch plant on Broadway here and will build extension for use of motor truck department. G. M. Ahlschwede is branch manager.

MILWAUKEE—Milwaukee Refining Machines Inc., 2081 South Fifty-sixth street, has been organized with D. H. Palmer as president, to manufacture units designed to re-refine crankcase drainings for further use as lubricant.

PORT WASHINGTON, WIS.—J. E. Gilson Co., gray iron founder, has let contracts for erection of an addition, 60 x 100 feet. New equipment includes modern sand-handling machinery.

Minnesota

CHISHOLM, MINN.—Board of education, Joseph Grams president, is considering erecting new electric power station to furnish service for all local schools. Cost estimated at $25,000.

South Dakota

RAPID CITY, S. DAK.—City, care of auditor, plans purchasing a pump and motor for waterworks system.

Kansas

INDEPENDENCE, KANS. — City plans waterworks improvements, including installation of oil engines, generators and centrifugal pumps.

Nebraska

STELLA, NEBR. — City has final plans in progress for erecting 40,000-gallon steel tank on tower, and installing 80-gallon-per-minute deep well turbine pump.

Colorado

FORT COLLINS, COLO.—City council has plans maturing for new municipal electric light and power plant, estimated to cost $740,000.

Idaho

WALLACE, IDAHO—Structures of the Federal Mining & Smelting Co., at the Jack Waite mine near here, recently damaged by fire, are to be replaced.

Pacific Coast

BARSLOW, CALIF. — American States Water Service Co., 1206 Maple avenue, Los Angeles, J. Benson manager, plans installing a 185,000-gallon electrically-welded steel tank here.

MOUNTAIN CITY, CALIF.—Allan Cutler Inc., 2065 Cowper street, Palo Alto, Calif., plans installing power equipment in new food products canning plant. A steam power house will be built. Entire project is reported to cost $200,000.

PORTLAND, OREG.—United States engineer, will take bids June 18, circular 20, on one 4000-kilowatt a.c. generator.

PORTLAND, OREG.—United States engineer will open bids June 18 for supplying one 4000-kilowatt alternating current generator for the Bonneville project.

AMERICAN LAKE, WASH.—Army quartermaster will open bids June 4 for transformer system and transmission line.

ILWACO, WASH.—City council is considering installation of a filtering water system.

GRANDVIEW, WASH.—Inland Fruit Co.s plant, recently damaged by fire, will be rebuilt and will include cold storage space.

PULLMAN, WASH. — Fire caused considerable damage May 21 to the plants of the Northwest Grain Co., State Grange warehouse, and Texaco Co.

SEATTLE—University of Washington regents, 1030 Henry building, will receive bids June 8 for furnishing steam turbo alternator, switchboard, switch gear and bridge crane, under PWA project 2680.

SEATTLE—In addition to $4,000,000 allotted for a new dry dock at the Puget Sound navy yard, $1,097,000 has been made available for improvements at the navy yard, Keyport torpedo station and Sand Point aviation station.

SNOHOMISH, WASH.—King Solomon Mining & Milling Co., Route No. 1, has been incorporated at $10,000, by A. W. Kannard and associates.

Dominion of Canada

TORONTO, ONT.—Hart Mfg. Co. Ltd., manufacturer of electrical switches and equipment, subsidiary of Hart Mfg. Co., Hartford, Conn., is starting operations here.